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W23 SOURCE CONTROL WELL PLAN

CONTENTS

SECTION A - Site Management Plan

SECTION B - Quality Assurance Project Plan

SECTION C - Health and Safety Plan

SECTION D - Community Relations Plan

APPENDIX A - Head Loss Calculations

APPENDIX B - Contract Specifications

APPENDIX C - Contingency Plan

BACK POCKET - Drawings 861737-001, 300 and 600

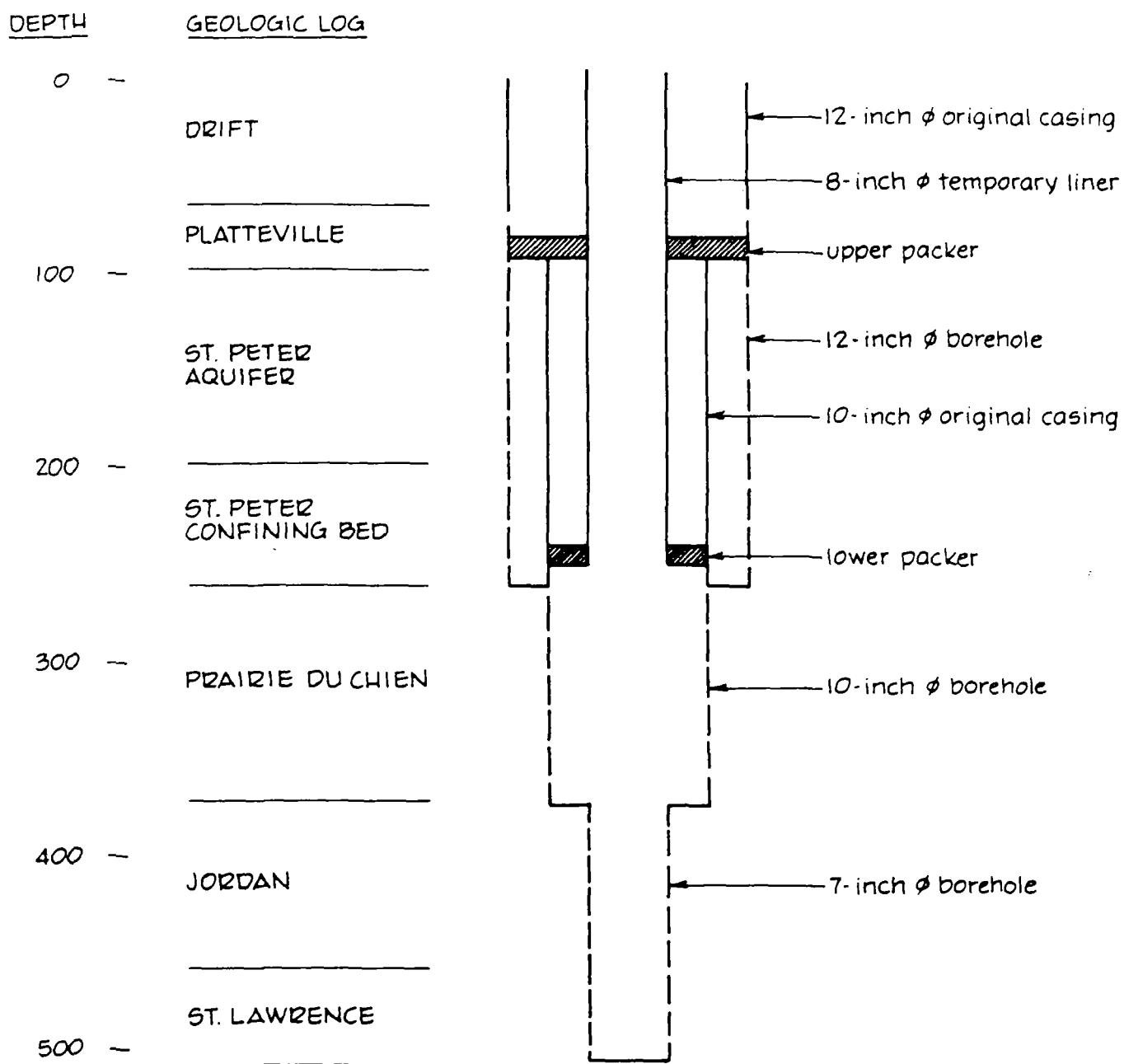
SECTION A
SITE MANAGEMENT PLAN

Source Control at W23

The Consent Decree-RAP requires well W23 to be reconstructed as a Prairie du Chien-Jordan Aquifer pumping well, with a monthly average pumping rate of 50 gallons per minute. To achieve this average pumping rate, a six-inch diameter well casing is needed.

The Prairie du Chien-Jordan Aquifer is situated in the interval from approximately 260 to 450 feet below the ground surface. Well W23 was drilled in 1917 and it penetrates the Prairie du Chien-Jordan Aquifer. Well W23 has been equipped with temporary packers and an eight-inch liner pending further work (Figure 1). The original casings in W23 include 12-inch casing from the ground surface to a depth of 65 feet and a 10-inch casing from a depth of about 90 feet to about 258 feet. When last measured, the bottom of the well extended to an approximate depth of 505 feet, although it could now be shallower due to sand entering the well (the Jordan Sandstone is poorly cemented and naturally friable in places).

Reconstructing old water wells can present unexpected practical difficulties and unusual hardships. For example, previous work on W23 lasted ten months instead of the estimated two months, because of unexpected trouble encountered while working on the well. Part of that previous work effort at W23 included pulling about 145 feet of original seven-inch casing from a ten-inch borehole. The seven-inch casing came out after approximately three months of effort. Other old wells in St. Louis Park have been reconstructed or abandoned, and have presented unexpected difficulties to the workers (e.g., well W38 in the D. A. Lubricents building, and well W112 -- the first St. Louis Park municipal well). The difficulties that may be encountered during well



Deeper portions of well W23
were sealed with bentonite.

Figure 1 Current Status of Well W23

reconstruction work at well W23 can be characterized as being unexpected in the sense that the nature and extent of the potential problems are hard to predict. On the other hand, it would not be unexpected to encounter problems during reconstruction that may increase the cost and/or duration of the work or may require a change in the scope of work. More importantly, there is a risk that problems encountered while reconstructing well W23 may require a change in the scope of work that involves abandoning well W23. However, source control could not be as effective in a replacement well for W23 due to the history and nature of contamination and the solution channel porosity of the Prairie du Chien Formation. The most effective source control can only be achieved by withdrawing water and contaminants from the same pathway that they originally entered the aquifer through W23. Therefore, the Project Leaders for Reilly, the EPA, MPCA, MDH and and the City of St. Louis Park have agreed that the potential risk of having to abandon well W23 due to unexpected problems should be minimized to the greatest extent possible.

Based on these considerations, the reconstruction of well W23 will be accomplished in the following manner:

- 1) Sound well W23 to determine the present depth to the bottom of the well.
- 2) If the well is deeper than 450 feet, grout the well to a depth of 450 feet to effectively seal off the lower units from the Prairie du Chien-Jordan Aquifer.
- 3) Place pea gravel in the well from the bottom to a depth of 260 feet.

- 4) Remove existing eight-inch liner and packers from well W23.
- 5) Perforate the original ten-inch diameter casing.
- 6) Install six-inch inside diameter steel casing within W23. The casing will extend from a depth of 260 feet to the ground surface (leaving an appropriate stickup for a well head).
- 7) Grout the annulus of the new six-inch casing.
- 8) Bail out pea gravel. Material bailed from the well will be disposed of according to applicable regulations.
- 9) Install submersible pump in new well at an approximate depth of 120 feet.
- 10) Upon completion of the well, establish a reference point at the well head for collecting water levels. Survey the horizontal location and vertical elevation of the reference point.

The finished well will be a 450-foot deep, six-inch inside diameter recovery well open only to the Prairie du Chien-Jordan Aquifer (Figure 2).

Perforating the ten-inch diameter casing will be done with a mechanical perforating device. The resulting perforation, together with holes that already exist in the casing (there are at least two holes in the ten-inch casing at depths of 213 and 217 feet), will allow grout to flow outside the ten-inch casing and form a good seal between the new six-inch liner and the St. Peter Formation.

The new six-inch casing will be equipped with centralizers positioned at 150 and 200 foot depths. These devices will help to keep the new casing centered within the 10-inch casing. A grout shoe will be attached to the bottom of the new six-inch casing and a fitting at the top of the casing will allow the neat cement, two percent bentonite

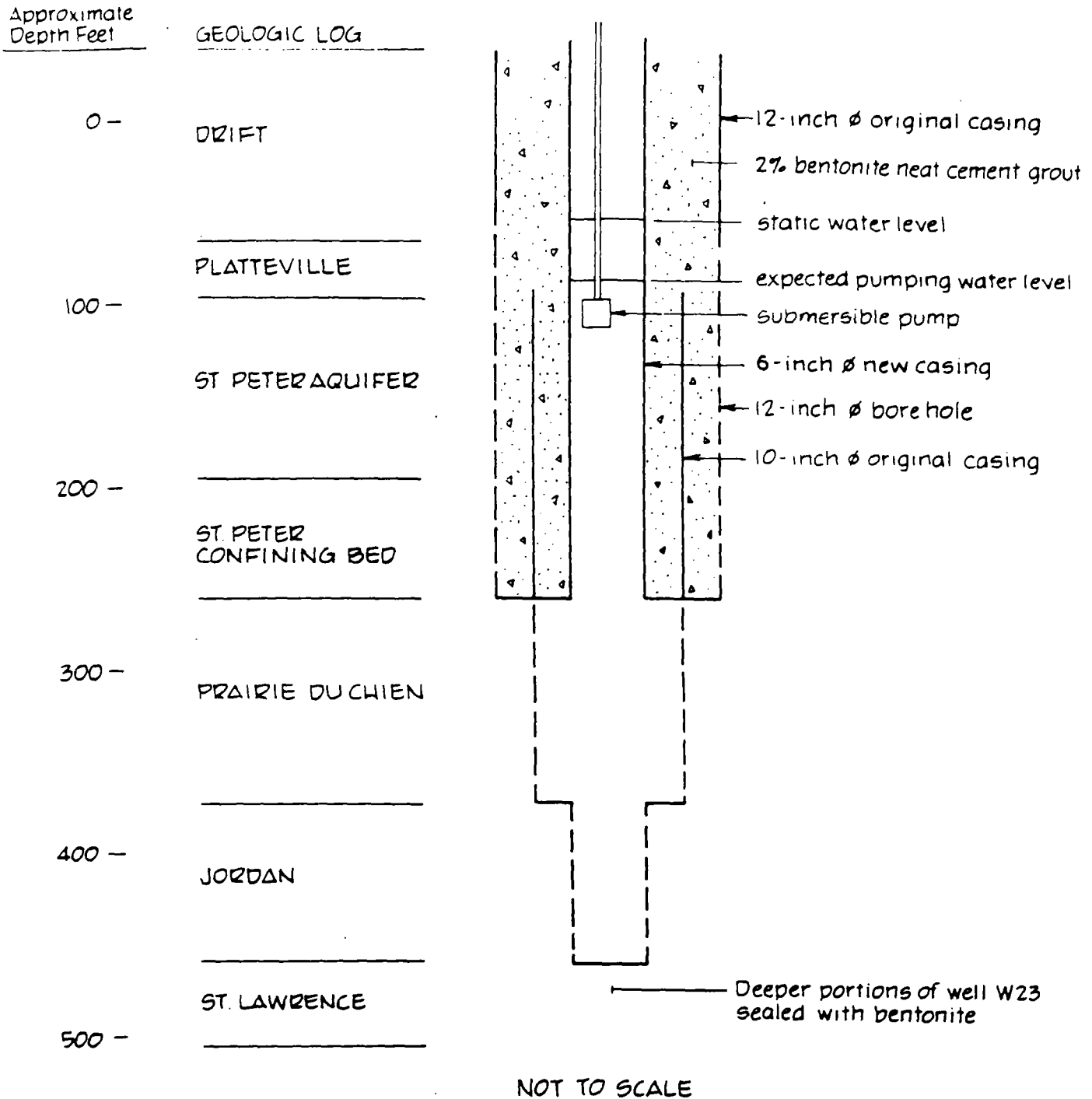


Figure 2 Final Design for Source Control Well W23

grout to be pressure injected from the surface, through the six-inch casing, and into the annular space outside the six-inch casing. The volume of the annular space outside the six-inch casing will be approximately 5 cubic yards. Approximately twice the calculated volume, or 10 cubic yards of grout will be pressure injected into the well. This will allow for enlargements of the borehole behind the ten-inch casing, and for a significant amount of grout loss in the Platteville Formation. The Platteville Formation has been known to accept large quantities of grout, but averages about three times the calculated volume. Therefore, if grout returns to the top of the well, it will be directed to a small nearby excavation where it will be buried. If grout returns to the surface, approximately 300 gallons of water from the 65 to 70 feet of annular space between the six and twelve-inch casings above the Platteville Formation will also be delivered to the surface, and this water will be directed to the sanitary sewer.

If the Platteville Formation accepts all of the grout that is pressure injected through the six-inch casing, then an additional grouting step will be necessary to fill the annular space between the new six-inch casing and the original twelve-inch casing and the twelve-inch borehole through the Platteville Formation. A tremie pipe will be used to fill the remaining annular space in well W23. If necessary, sand or small gravel will be used to plug the fractures in the Platteville in order to complete the grouting procedure.

Any contaminated materials encountered during the reconstruction of well W23 will be handled in accordance with the Contingency Plan presented in Appendix C, with the exception of the excess grout and water that may be generated during grouting, as described above.

Pump Specifications and Installation

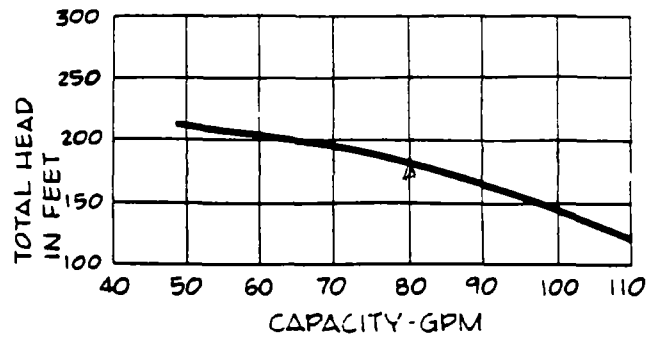
Well W23 will be pumped at a monthly average rate of 50 gallons per minute in accordance with the RAP. The total head lift that the submersible pump will be required to overcome is estimated to be 185 feet (Appendix A). A 4-inch diameter, 3-phase, 5 hp submersible pump will be required to achieve the required pumping rate and total head lift. A Grundfos Model SP16-5 or equivalent will be used for this purpose. The rating curve and specifications of this pump are shown in Figure 3. The construction materials for the submersible pump and discharge pump will be as follows:

- The submersible pump will be constructed of stainless steel;
- The submersible pump's natural butanol rubber (NBR) impeller seal ring will be retrofitted with teflon;
- A 2-inch national pipe thread (NPT) discharge pipe will extend from the pump outlet to the point of discharge. The discharge pipe will be constructed of galvanized steel. The 3-inch outlet from the pump will be stepped down to two inches within the well.

The use of low carbon galvanized steel and stainless steel components as well as retrofitting the NBR components with Teflon components will increase the operational life expectancy of the system.

SP 16-5

PERFORMANCE CURVE



DIMENSIONS AND WEIGHT

MODEL NO.	HP	MIN. WELL SIZE	LENGTH	APPROX. UNIT SHIPPING WT. (LBS.)
SP 16-5	5	6"	44 3/8"	87

NOMINAL FLOW RATE - 80 GPM

FLOW RANGE - 48 to 110 GPM

PUMP OUTLET - 3" NPT

Figure 3 Pump Specifications for W23

Pumphouse Design and Construction

The design of the W23 pumphouse is based on providing a structure and equipment suitable for what is assumed to be a long-term operation (possibly decades) with minimal maintenance and operating requirements. The pumphouse is designed as a 7'4" by 7'4" walk-in building with plenty of room for maintenance work. The roof is provided with a removable panel to allow for access to the well by a drill rig.

The W23 pumphouse will be a solidly-built masonry structure with a concrete floor. The wall structure will be masonry block with a brick veneer (color to match the condominiums to the north) to make a more attractive building. Insulation will be provided in the roof and walls and under the floor for energy efficiency. A gravel driveway off Walker Street is included to provide access and off-street parking for inspection and maintenance personnel. Electric heating and lighting and a floor drain will be provided inside the pumphouse. The floor drain will discharge via a gravity line to an existing sanitary sewer manhole on Walker Street. The pumphouse floor grade will be about 1.5 feet above the existing grade so as to provide drainage away from the building.

Complete construction specifications and blueprints for the W23 pumphouse are presented in Appendix B. These specifications will be used in obtaining bids and contracting for the construction work.

Piping Design and Construction

The piping design for the W23 source control well is also based on providing for long-term, low-maintenance operation. Galvanized pipe will be used from the wellhead to a point just outside the pumphouse, where carbon steel pipe wrapped with polyurethane insulation and a polyethylene jacket will be used for the underground run to the sanitary sewer. The discharge line inside the pumphouse will be provided with a wellhead pressure gauge, followed by a shut-off valve, a flow controller, a flow meter, a reduced pressure backflow preventer, a sample tap, a downstream pressure gauge, and a check valve. The flow meter will signal a combined circular chart recorder/totalizer.

The discharge from the well W23 will be routed south under the gravel driveway to join that from W105 at a point just outside the W105 pumphouse. The combined flows from wells W23 and W105 will then run under pressure from the connection at W105 to an existing sanitary sewer manhole on Walker Street. This discharge line will be laid under the gravel driveway to minimize disruption of the site surface. All of the discharge piping will be polyurethane-insulated, polyethylene-jacketed carbon steel laid at least four (4) feet underground. The polyurethane insulation will protect against freezing, and the polyethylene jacket will protect against corrosion.

The floor drain line from the W23 pumphouse will be joined with the W105 floor drain line just outside the W105 pumphouse. The combined flows will then run by gravity to the same sanitary sewer manhole on Walker Street that will receive the pressure discharges from wells W23

and W105. The gravity drain line will also be polyurethane-insulated and polyethylene-jacketed carbon steel and laid in the same trench as the pressure discharge line.

Complete construction specifications and blueprints for the W23 discharge piping and sanitary sewer connection are also presented in Appendix B.

Contingent Actions for Contaminated Soils

It is possible that soils contaminated with coal tar materials will be encountered during the excavation required for the W23 pumphouse foundation, dry well, and/or underground discharge piping. It is likely, however, that any contaminated soils will be thoroughly weathered -- given the site's long history and the relatively shallow excavation depths (4 to 6 feet). Hence, it is unlikely that volatile or "runny" coal tar wastes or contamination will be encountered.

If any coal tar wastes or contaminated soils are encountered during excavation work, Reilly's Project Manager, Engineering Manager or Hydrogeology Project Manager/Field Coordinator (see Section B -- Quality Assurance Project Plan) will determine if the material is suitable for use as backfill based on the following visual determination:

Excavated material containing creosote or coal tar constituents may be used as backfill material if neither the creosote nor coal tar constituents have undertaken a cementitious nature so as to artificially bond the excavated

soil structure as a concrete unit. / In the event that creosote or coal tar constituents are encountered in a definable homogeneous mass of excessive concentration or amount sufficient to preclude heterogeneous mixing with undisturbed earthen materials, the creosote or coal tar materials will be classified as unsuitable for backfill material. /

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see
Cahylog*

Any contaminated materials suitable for and used as backfill will be covered with at least twelve inches of clean fill before final grading (see RAP Section 11.5.3(A)(5)). Any contaminated soils that are unsuitable for backfilling will be temporarily stockpiled at the W105/W23 construction site until all of the excavation work required for wells W23 and W105 is completed. The stockpiled material will then be disposed of off-site in accordance with all applicable state and federal hazardous and solid waste regulations at a RCRA TSD facility.

Any temporary stockpile of contaminated soils for off-site disposal will be covered with plastic sheeting at the end of each work day. The cover sheeting will also be disposed of off-site -- in accordance with all applicable rules and regulations -- after the stockpiled soils are removed for disposal. Any temporary stockpile should be in active use for no more than 30 days, given the detailed construction schedule presented later. In any event, any temporary stockpile will be removed no more than 90 days after it was started and will cause no imminent or actual endangerment to the public health or the environment.

The Health and Safety Plan for this work (see Section C) recognizes that coal tar contamination may be encountered during excavation work and specifies appropriate procedures for worker protection if contamination is encountered.

Operation and Monitoring

Pumping of the W23 source control well will begin within 5 days of receiving approval of the construction, from the EPA, MPCA and MDH Project Leaders. The well will be pumped at a monthly average rate of 50 gpm, as specified by RAP Section 7.1.3, until a request to cease pumping is approved pursuant to RAP Section 7.1.4. Reilly will notify the EPA, MPCA and MDH when the W23 construction is completed and ready for their inspection and approval. Further details on the inspection, approval and start-up process are provided in Section 6.0 of the Quality Assurance Project Plan (Section B).

The W23 source control well will be operated by the City of St. Louis Park (the City) on behalf of Reilly Tar & Chemical Corporation (Reilly) in accordance with the Reilly/City Agreement (Exhibit B to the Consent Decree) beginning on the day that pumping is started. The City will inspect the W23 pump operation at least twice per week. All inspections will be noted in a log book using a form like the one shown in Figure 4. The flow meter totalizer reading, date, time, inspector's name, and any relevant comments will be recorded in the log during each inspection. The log book will be kept at the W23 pumphouse with a backup copy kept at City Hall. The log book and circular recorder

FIGURE 4

INSPECTION LOG FOR THE W23 SOURCE CONTROL WELL

[illegible]

charts will be maintained as permanent records by the City in accordance with applicable state and local statutes. The EPA and MPCA will be notified by the City before any of these records are destroyed.

The W23 source control well will be pumped continuously, except for brief shut-down periods required for maintenance and/or repair. The City will notify the EPA and MPCA Project Leaders of any shutdown lasting more than three working days, with an explanation of the cause and an estimated date when pumping will be restarted. Shut-down periods for maintenance or repair are expected to be brief and infrequent because of the simple equipment involved.

W23 will normally be pumped at a rate of 50 gpm, but this rate will be increased as required after shut-down periods in order to maintain a monthly average rate of 50 gpm. The monthly average rate will be calculated on a calendar month basis using the flow totalizer readings in the inspection log. Average flow rates for the month-to-date will be calculated and noted in the log book at least once a week to help ensure that the 50 gpm monthly average rate will be met each month. The circular charts from the flow recorder ^{totalizer} will not be used to determine compliance with the 50 gpm monthly average rate requirement, because the totalizer gives more accurate readings. The circular charts are intended to document any variations in flow rate and any shut-down periods.

Monthly average pumping rates for W23 will be reported for the applicable calendar months in the progress reports required by Part K of the Consent Decree. In addition, the City will provide copies of the

log book and circular charts to the EPA and MPCA Project Leaders on a monthly basis during the first year of operation.

Control of the well discharge rate will be accomplished using both the flow controller and the recorder/totalizer. The desired flow rate can be set initially by the scale on the flow controller. Over a period of hours or days, the totalizer readings can be used to check the flow rate and the initial controller setting adjusted accordingly. Once routine operation is established, the totalizer readings and times noted in the log book -- or the circular chart recorder reading -- can be used to check the flow rate and the flow controller setting adjusted as necessary.

The discharge from W23 will be monitored for Carcinogenic PAH and Other PAH quarterly during the first year of pumping and biannually thereafter, as specified by RAP Section 7.3(B). The monitoring will be performed by the City in accordance with the Reilly/City Agreement. In addition, Reilly will monitor the discharge from W23 for Carcinogenic PAH and Other PAH once during the first week of pumping. This initial monitoring is not required by the RAP, but is suggested by Reilly to aid in time-series analysis of the W23 monitoring data. Sampling and analysis for the first week monitoring will be conducted by ERT using the procedures specified in the "Initial Sampling Plan for the Reilly Tar & Chemical Corp. NPL Site - St. Louis Park, Minnesota" (submitted to the EPA and MPCA by the City on October 3, 1986 pursuant to RAP Sections 3.2 and 3.3) as approved by the EPA and MPCA.

It should be noted that Section 2(c) of the Reilly/City Agreement requires that the discharge from W23 will be routed to the storm sewer before the fourth anniversary of the Effective Date of the Consent Decree. This change may require pretreatment of the discharge, depending on the NPDES effluent limitations established pursuant to RAP Section 2.5. Discontinuance of the discharge to the sanitary sewer will be implemented in accordance with RAP Section 2.9.

Construction Schedule

Section 7.1.2 of the RAP specifies that construction of the W23 source control well must be completed within 60 days of receiving DNR and MWCC permits and receiving approval of this plan, whichever comes later. The 60-day period results in a tight schedule, but should be adequate for the required construction work if no unexpected difficulties are encountered.

Figure 5 presents the detailed construction schedule currently planned for the W23 source control well work. This schedule is subject to modification as the work progresses, and Reilly makes no commitments to meeting any of the schedule dates other than the 60-day completion requirement specified in the RAP (subject to any extensions requested and granted in accordance with the Consent Decree). The schedule in Figure 5 is provided solely to assist the EPA, MPCA, MDH and City of St. Louis Park in planning inspections of the work. The Project Leaders for these entities will be provided with an updated schedule before

FIGURE 5

PRELIMINARY SCHEDULE FOR W23 CONSTRUCTION

DAY NUMBER

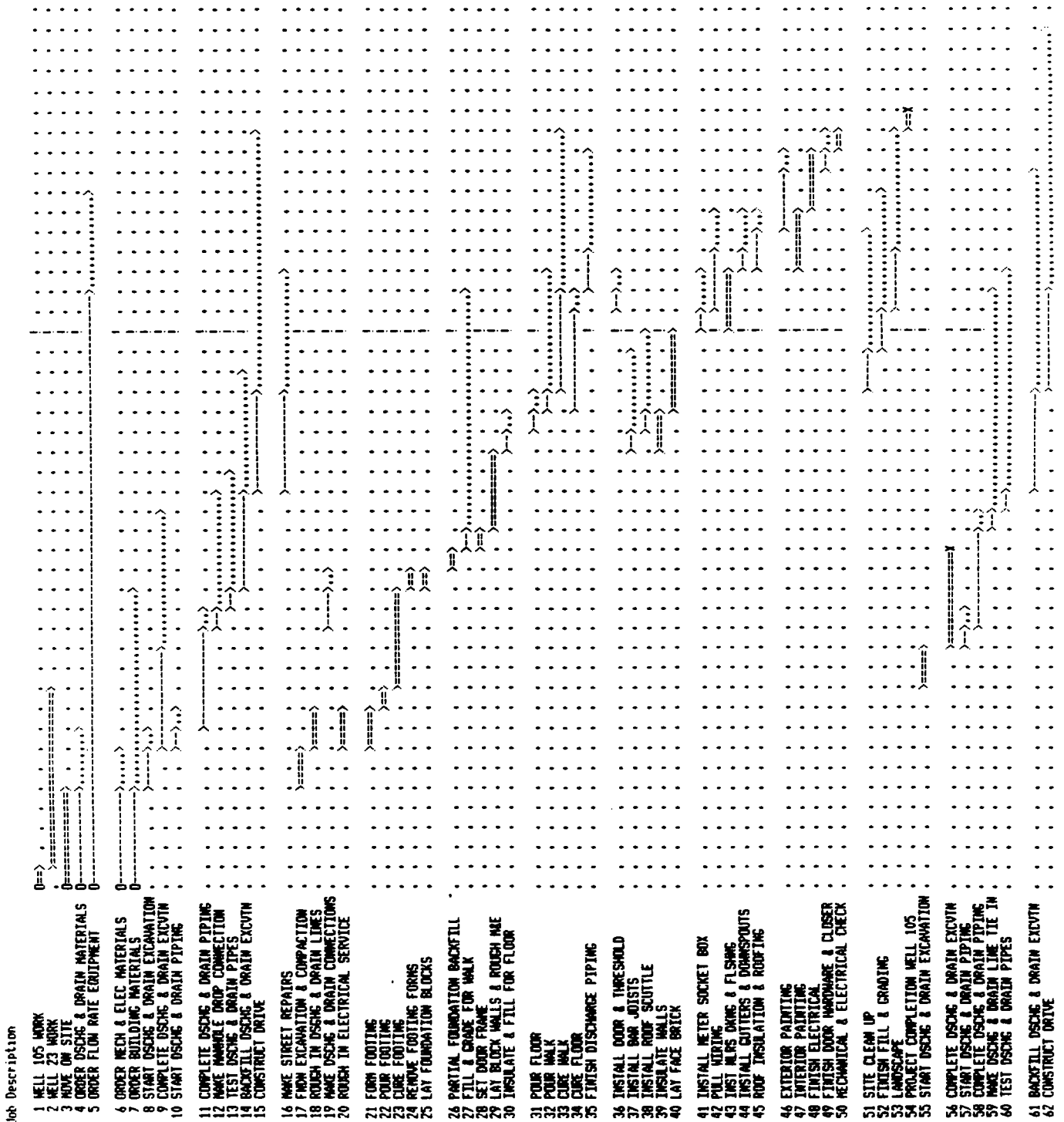
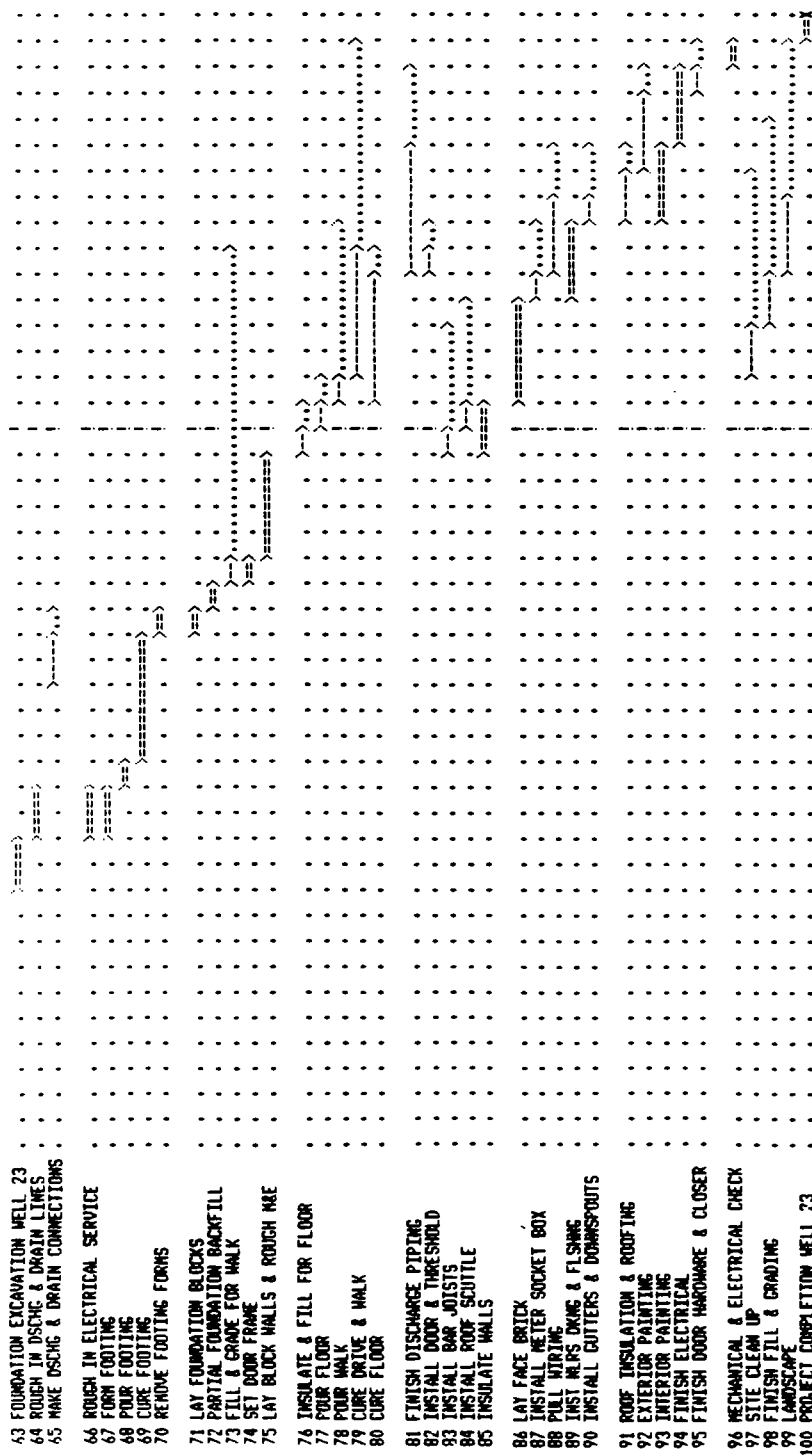


FIGURE 5 (CONT'D)



SORTING ORDER IS CURRENT ORDER
FROM THE FIRST JOB TO THE LAST JOB
JOBS USING ALL SKILLS

Symbol-Explanation
>--> Duration of a normal job
>--> Slack time for a normal job
>==> Duration of a critical path job
>::> Duration of a completed job
x Job with zero duration
a Job deadline
0--> Job with no prerequisites
>--x Job with no successors
I Time break due to holiday or week-off

beginning any on-site work and as required by any major schedule changes after the work has started.

The schedule in Figure 5 indicates that the work at W23 will proceed simultaneously with that at W105. This is an important aspect of the work as far as minimizing disruption at the site during construction and meeting the 60-day schedule effectively. This is particularly the case for construction items common to each well, such as the access driveway, underground discharge line and electrical service connection. It would be helpful, therefore, if all plan and permit approvals required for W105 and W23 could be granted simultaneously.

Figure 5 indicates a total schedule of 44 working days for completing the W23 construction. This amounts to 60 calendar days if work is started on a Monday or Tuesday with a five-day work week. This is obviously a tight schedule, so weekend work and/or excused delays (pursuant to Part N of the Consent Decree) may be required if unexpected difficulties are encountered.

As indicated above, Section 7.1.2 of the RAP specifies that the 60-day construction period for W23 starts when Reilly receives approval of this plan and receives DNR water appropriation and MWCC sanitary sewer discharge permits, whichever occurs last. Reilly is also required to obtain various permits from the City before beginning work. In order to comply with Part T of the Consent Decree (Other Applicable Laws), the EPA, MPCA and MDH have agreed to make their approval of this plan effective upon the day that the City issues the required permits, provided that this occurs within 60 Days of Reilly's receipt of the

If > 60 days for the city to provide permits, then the effective date will be 60 days from

approval letter. A Reilly will submit the required City permit applications promptly after receiving approval of this plan from the EPA, MPCA and MDH, and will provide copies of the City permit applications to these agencies. Reilly will notify the EPA, MPCA and MDH by certified mail promptly after receiving the last of all required City, DNR and MWCC permits, and the 60-day construction period will begin on the day that Reilly receives the last required permit.

SECTION B
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
FOR W23 WORK AT THE
RTCC - ST. LOUIS PARK SITE

ERT Document No. QAD722-270
January 1987

Prepared for
REILLY TAR & CHEMICAL CORPORATION
INDIANAPOLIS, INDIANA

ERT - A RESOURCE ENGINEERING COMPANY
696 Virginia Road, Concord, Massachusetts 01742

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Background	1
1.2 Quality Objectives	1
2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES	2
3.0 QA/QC - FIELD ACTIVITIES	2
3.1 Training	2
3.2 Subcontractor Quality Control	4
3.3 Document Control and Recordkeeping	5
4.0 NUMERICAL ANALYSIS AND PEER REVIEW	6
5.0 AUDITS AND CORRECTIVE ACTION	7
6.0 CONSTRUCTION APPROVAL	7

1.0 INTRODUCTION

1.1 Background

ERT and the Reilly Tar & Chemical Corporation (RTCC) will complete certain tasks in fulfillment of the Consent Decree and Remedial Action Plan for the St. Louis Park Site. This Quality Assurance Project Plan pertains to all work to be performed by ERT, RTCC and subcontractors to convert the former supply well (now a groundwater monitoring well) identified by number W23 to a source control well by replacing the existing 8-inch diameter casing with a 6-inch diameter casing, grouting, installing a pump, a well house and all necessary piping and connections to direct the pump outflow to the nearby sanitary sewer line. Further details on the work to be performed, its purpose and the methodology to be employed may be found in the project Site Management Plan.

1.2 Quality Objectives

The purpose of this Quality Assurance Project Plan is to define the Quality Assurance and Quality Control provisions to be implemented to ensure that:

- o The resulting source control well conforms to design specifications given in the project Site Management Plan.
- o The work is performed in an efficient manner.
- o Field records generated during the course of the field work are complete and accurate.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization is illustrated in Figure 2-1. The RTCC Project Manager, Mr. John Craun will oversee and coordinate all project activities. The ERT Project Manager/Field Coordinator, Mr. William Gregg, will schedule and direct all field activities and will conduct correspondence with RTCC. The Project Manager/Field Coordinator is also responsible for maintaining records of the work performed on the project and for archiving those records in the Central File upon completion of the work. The RTCC Engineering Manager, Mr. Lewis Locke will direct the engineering aspects of the work, including the installation of the sewer line connection and pump house. The Project Quality Assurance Officers are responsible for ensuring that this plan is implemented by their respective organizations, and that project data undergo technical and peer review, as necessary. The pump installation contractor will perform all work necessary to install the casing and pump and make it operational. The sewer line connection subcontractor will install piping and connection to the sewer line and will install a well house to enclose the well and pump.

3.0 QA/QC - FIELD ACTIVITIES

3.1 Training

In order to ensure that the two subcontractors doing the field work can do so in a cooperative and efficient manner, instruction and guidance will be

provided by the RTCC Project Manager and the ERT Project Manager/Field Coordinator to instill an understanding of the project objectives and plans and of the respective roles of the subcontractors.

3.2 Subcontractor Quality Control

Subcontractor quality control is that system of activities which ensures that products or services obtained from subcontractors fulfill the needs of the project. Subcontractor quality control begins with subcontractor procurement. The project policy for control of procurement is described in the ERT Quality Assurance Manual for Hazardous Waste Site Investigations, Chapter 5. The subcontractor procurement process considers:

- o Bidder's qualifications in terms of personnel and physical resources, Quality Assurance program and Health and Safety program,
- o Results of pre-qualification audits, if appropriate,
- o Price and technical qualifications

Periodic quality control inspections of each contractor will be performed by the RTCC Engineering Manager and the ERT Project Manager/Field Coordinator to evaluate adherence to the Quality Assurance Project Plan and the project Health and Safety Plan. Inspection will include (as appropriate):

- Type and condition of equipment,
- Calibration procedures,
- Personnel qualifications,
- Decontamination procedures,
- Documentation.

Results of the inspection will be entered in the field notebook.

3.3 Document Control and Recordkeeping

Document Control for the W105 work serves a two-fold purpose. It is a formal system of activities that ensures that:

- 1) All participants in the project are promptly informed of revisions of the Quality Assurance Project Plan; and
- 2) All critical documents generated during the course of the work are accounted for during, and at the end of the project.

This QA Project Plan and all Standard Operating Procedure documents have the following information on each page:

- Document Number
- Page Number
- Total number of pages in document
- Revision number
- Revision date

When any of these documents are revised, the affected pages are reissued to all personnel listed as document holders with updated revision numbers and dates. Issuance of revisions is accompanied by explicit instructions as to which documents or portions of documents have become obsolete.

Control of, and accounting for documents generated during the course of the project is achieved by assigning the responsibility for document issuance and archiving. For the W105 work, the RTCC Project Manager and the ERT Project Manager/Field Coordinator have this responsibility.

Documentation for the project will either be recorded in non-erasable ink, or will be photocopied promptly upon completion, and the photocopies dated. All documents will be signed by the person completing them.

4.0 NUMERICAL ANALYSIS AND PEER REVIEW

All numerical analyses, including manual calculations, mapping, and computer modeling will be documented and subjected to quality control review in accordance with ERT SOP 2005, Numerical Analysis and Peer Review. All records of numerical analyses will be legible, reproduction-quality and complete enough to permit logical reconstruction by a qualified individual other than the originator.

5.0 AUDITS AND CORRECTIVE ACTION

ERT conducts periodic audits to assess the level of adherence to QA policies, procedures and project plans.

Whenever quality deficiencies are observed that warrant immediate attention, formal corrective action request forms are issued to the project manager by the Quality Assurance Department. The QA Department retains one copy of the form when it is issued. The project manager completes the form and signs it when corrective action has been implemented, and returns the original to the QA Officer to close the loop.

The Quality Assurance Department maintains a record of all corrective action requests and reports their status to ERT management in a quarterly report.

Should an audit be conducted on the W105 activities, RTCC will be apprised of the audit findings and of any corrective action that is requested and performed.

6.0 CONSTRUCTION APPROVAL

423 The Reilly Project Leader (or Alternate) will provide written notification to the U.S. EPA, MPCA and City Project Leaders within 3 days of completing construction of the W105 source control well system. Following receipt of such notification, the U.S. EPA, MPCA and City Project Leaders (or their designees) will inspect the system and Reilly will demonstrate that the system has been constructed and operates in accordance with the approved

^{W23}
W105 source control well plan. Following their inspection of the system, the U.S. EPA and MPCA Project Leaders (or Alternates) will notify the Reilly Project Leader in writing as to whether the W105 source control well system is approved or disapproved. In the event that the system is approved, the City will commence operation of the system within 5 days of Reilly's receipt of the approval letter. In the event that the system is disapproved, the U.S. EPA and MPCA Project Leaders will explain in writing the basis for the disapproval and the items that need to be corrected, and Reilly will either correct the items or explain in writing why the system should be approved as constructed. If corrections are made, the notification, inspection, and approval/disapproval sequence described above will be repeated.

The U.S. EPA, MPCA, City and Reilly recognize that the inspection and approval procedure described above represents procedures beyond those required by Section 6.1 of the RAP. The U.S. EPA and MPCA therefore agree that, with respect to the provisions of Part M of the Consent Decree, Reilly will be deemed to have met the schedule requirements specified in Section 6.1 of the RAP if the Reilly Project Leader provides notice that the W105 ^{W23} construction is complete within 60 days of the start of the construction period and, if the City commences operation of the W105 system within 5 days of Reilly's receipt of approval of the construction, and it works as

^{W23}
specified in the RAP.

Notwithstanding the procedures described above, the City, U.S. EPA, MPCA and Reilly reserve all of their rights under the Consent Decree for dispute resolution, extension requests and related actions with respect to the construction, inspection, approval and operation of the W105 source control well system.

W105

SECTION C
HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

for the

Reilly Tar & Chemical Corporation
St. Louis Park, Minnesota Site
W23 Source Control Well Construction

Project Number: D722-295

Division Number: 120

Date: January 2, 1987

Prepared By: Kevin Powers

Date: January 2, 1987

Approved By: John Kram for
Peter Stranahan
Date: 1/28/87

Kevin Powers
Health & Safety Manager
Date: 1/27/87

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION AND HISTORY	1
3.0 SCOPE OF WORK	2
4.0 CONTAMINANTS OF CONCERN AND EFFECTS OF OVEREXPOSURE	2
5.0 HAZARD ASSESSMENT	3
5.1 Initial	3
5.2 Continuing HAZard Assessment On-Site	3
6.0 PERSONAL PROTECTIVE EQUIPMENT	4
7.0 HEALTH AND SAFETY TRAINING	6
8.0 DECONTAMINATION	7
9.0 EMERGENCY PROCEDURES	9
9.1 General	9
9.2 Responses to Specific Situations	11
9.3 Notification	12

HEALTH AND SAFETY PLAN

1.0 Introduction

This health and safety plan applies to on-site personnel who will potentially be exposed to soil and/or groundwater contamination during the construction of the W23 source control well at the Reilly Tar & Chemical Corporation, St. Louis Park site. This plan has been designed to comply with, as a minimum, the requirements set forth in 29 CFR 1910.120, the OSHA standards governing hazardous waste operations. The ERT Project Manager and project staff will be responsible for continuous adherence to the safety procedures during site work at St. Louis Park. In no case may work be performed in a manner that conflicts with the intent of or the safety concerns expressed in this plan. Other contractors and subcontractors involved in this project will be required to adhere to this safety plan, as a minimum, and to conduct all work in accordance with applicable health and safety regulations, including 29 CFR 1910.120.

2.0 Site Description and History

Reilly Tar & Chemical Corporation (RTCC) operated a creosote wood preserving plant and coal tar refinery in St. Louis Park, Minnesota from 1917 to 1972. In 1972 the plant site was sold to the City of St. Louis Park and the plant was removed. The 80-acre site was subsequently converted to a variety of productive uses, including an apartment complex, some commercial buildings, a new roadway and a large open park. Contamination by creosote and coal tar-related materials of soil, shallow ground water and a deep bedrock well have occurred at the site. Also, certain coal tar-related chemicals have been found in portions of deep bedrock aquifers in the St. Louis Park area.

3.0 Scope of Work

Specific work activities at the site will include reconstructing well W23 by replacing some of the existing casing, installation of a permanent pump, connection of the pump discharge to the sanitary sewer, and erection of a brick-and-block wellhouse. A trench will be dug from well W23 to the sanitary sewer in order to make the discharge connection.

Exposure to the contaminants described below may occur during the performance of these activities.

4.0 Contaminants of Concern and Effects of Overexposure

The contaminants of concern which have been identified at this site are coal tar and creosote-related materials including naphthalene, other polynuclear aromatic hydrocarbons (PAH) and phenolic compounds. Overexposure to naphthalene, other PAH and/or phenolic compounds may cause toxic effects described below.

Coal tar and creosote are typically irritating to the eyes, skin and respiratory tract. Acute skin contact may cause burning and itching while prolonged contact and poor hygiene practices may produce dermatitis. Prolonged skin contact with creosote must be avoided to prevent the possibility of skin absorption.

Naphthalene is a hemolytic agent which, upon overexposure to the vapor or ingestion of the solid, may produce a variety of symptoms associated with the breakdown of red blood cells. Naphthalene is also irritating to the eyes and repeated or prolonged contact has been associated with the production of cataracts.

Repeated exposure to certain PAH compounds has been associated with the production of cancer. Contact of PAH compounds with the skin may cause photosensitization of the skin producing skin burns after subsequent exposure to ultraviolet radiation.

Phenolics are generally strong irritants which can have a corrosive effect on the skin and can also rapidly penetrate the skin. Overexposure to phenols and phenolic compounds may cause convulsions as well as liver and kidney damage.

5.0 Hazard Assessment

5.1 Initial

Because of the relatively low vapor pressures associated with PAH compounds (generally less than 10^{-4} mm Hg at 20°C), they are not expected to present a vapor hazard at this site. The most likely threat of exposure to these compounds will be via skin contact.

Although naphthalene and phenol also have relatively low vapor pressures (0.05 and 0.36 mm Hg at 20°C, respectively) there is a possibility that these substances may produce vapor hazards at this site under adverse conditions.

5.2 Continuing Hazard Assessment On-Site

Air Monitoring

An HNU Photoionization Detector (PID) equipped with a 10.2 eV lamp will be used to provide semiquantitative data on VOC concentrations in and around the breathing zone of workers. Air sampling will be conducted by taking and recording periodic readings in the breathing zone at each of the following locations:

- In the breathing zone near the opening of the well being drilled or reconstructed.
- In the breathing zone over freshly-exposed soil being excavated.

Action Limits

The American Conference of Governmental Industrial Hygienists (ACGIH) has established threshold limit values (TLV) for phenol and naphthalene at 5 and 10 ppm, respectively, as 8-hour time weighted averages (TWA). Based on these values, the action limits in Table 1 have been set. The lower limit of 5 ppm is based on the TLV for phenol while the upper limit of 50 ppm is based on a minimum protection factor of 10 for a half-mask, air purifying respirator.

Response

When the PID yields persistent breathing-zone readings at or above the lower action limit, workers in the affected area will don respirators. Air sampling will continue on a more frequent basis. If readings are persistent at or above the upper limit, workers shall back off from the immediate work area until measured breathing-zone concentrations fall below the lower limit, at which time operations will resume and normal air monitoring will continue. If breathing zone levels do not fall below the upper limit, workers are to leave the work area and report the condition immediately to the Health and Safety Manager. If necessary, engineering controls will be instituted to maintain vapor concentrations below the upper limit or arrangements will be made to upgrade to Level B protection.

6.0 Personal Protective Equipment

Personal protective equipment (PPE) will be donned, as necessary, based on the hazards encountered. Listed below is the personal protective equipment to be utilized during this project and the conditions requiring its use.

TABLE 1
ACTION LIMITS FOR AIR CONTAMINANTS

<u>Limit</u>	<u>Persistent Concentration in the Breathing Zone</u>	<u>Procedure</u>
Lower	5 ppm	Don respirators, step up monitoring.
Upper	50 ppm	Stop work and back off from immediate work area until levels subside in the breathing zone.

Personal Protective Equipment

- Coveralls - Polyethylene coated Tyvek if work involves contact with contaminated soil or ground water.
- Boots - Chemical resistant type if work involves contact with contaminated soil or groundwater.
- Hard Hat - When working in the vicinity of operating heavy machinery (i.e., drilling rig, backhoe, etc.)
- Face shield - If splash hazard exists.
- Gloves - Nitrile for potential contact with contaminated soil or ground water.
- Respirator - MSA Comfo II with GMC-H Cartridges if PID reading exceeds 5 ppm or if dust or odors become objectionable.
- Chemical Safety Goggles - If eye irritation occurs.

Because of the carcinogenicity of certain PAH compounds, and because of the skin hazards associated with PAH and phenolic compounds, it is important that appropriate protective clothing be worn during work activities, such as drilling and excavation, which may involve the possibility of skin contact with contaminated soil or ground water. As a minimum, the presence of visible creosote or coal tar-related material shall constitute evidence of contaminated soil or groundwater.

7.0 Health and Safety Training

Site personnel covered by this health and safety plan must have received appropriate health and safety training prior to their working on the site. Training will include:

- Requirements for ERT employees to have received the baseline medical examination within one year of on-site work.

- Requirements for and use of respirators and personal protective equipment.
- Cautions regarding the potential for trench collapse.
- Required personal hygiene practices.
- Requirements for employees to work in pairs.
- Proper material handling.
- Proper sampling procedures.
- Maintenance of safety equipment.
- Effective response to any emergency.
- Responses to fires and explosions.
- Emergency procedures (e.g., in the event of a trench collapse).
- Hazard zones.
- Decontamination methods.
- General safety precautions.

A copy of the Standard Safety Procedures (Table 2) will be given to each worker covered by this health and safety plan.

8.0 Decontamination

Administrative procedures require hygienic practices consistent with work hazards. Employees will be instructed in the training program on proper personal hygiene procedures.

Contaminated, reuseable PPE, such as boots, hard hats, face shields and goggles, will be decontaminated prior to leaving the site. The decontamination procedure follows.

- Rinse with water to removed gross contamination.
- Wash in Alconox or equivalent detergent solution.
- Rinse with clean water.

Contaminated, disposable PPE, such as Tyvek coveralls and gloves, will be placed in 55-gallon drums and stored on site while arrangements are made for disposal.

TABLE 2
STANDARD SAFETY PROCEDURES
RTCC ST. LOUIS PARK SITE

- ERT employees are required to have a baseline medical examination within one year of on-site activity.
- Employees are required to work in pairs.
- Wash face and hands prior to eating, smoking, or leaving the site.
- No smoking or eating is allowed in the work area during active drilling, excavation or sampling activities.
- Wearing of contact lenses is not permitted in the work area.
- Contaminated material (e.g., Tyvek coveralls) must be properly disposed of before leaving the site.
- All work must be conducted in accordance with local, state and federal EPA and OSHA regulations, particularly 29 CFR 1910.120.
- The walls of trenches greater than 4 feet in depth must be sloped back to the angle of repose prior to entering. For average soil, an angle of 45° is recommended.

Respirators, if used, will be cleaned and disinfected after each day of use. The facepiece (with cartridge removed) will be washed in a hypochlorite (or equivalent) disinfecting solution, rinsed in warm water and air dried in a clean place.

9.0 Emergency Procedures

This Health and Safety Plan has been established to allow site operations to be conducted without adverse impacts on worker health and safety as well as public health and safety. In addition, supplementary emergency response procedures have been developed to cover extraordinary conditions at the site.

9.1 General

All accidents and unusual events will be dealt with in a manner to minimize a continued health risk to site workers. In the event that an accident or other unusual event occurs, the following procedure will be followed:

- First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be conducted so that those rendering assistance are not placed in a situation of unacceptable risk. In the event that a worker is caught in a trench collapse, call for emergency assistance immediately.
- All accidents/unusual events must be immediately reported to the ERT Health and Safety Manager, the ERT Project Manager, and the other contacts listed in Table 3.
- All workers on site should conduct themselves in a mature, calm manner in the event of an accident/unusual event, to avoid spreading the danger to themselves, surrounding workers and the community.

9.2 Responses to Specific Situations

Emergency procedures for specific situations are given in the following paragraphs.

Worker Injury

If an employee in a contaminated area is physically injured, Red Cross first-aid procedures will be followed. Depending on the severity of the injury, emergency medical response may be sought. If an excavation collapses and a worker is caught, call for emergency assistance immediately. If the person is in no immediate danger, do not attempt to move him. Internal injuries could be worsened. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where contaminated clothing (if any) will be removed, emergency first-aid administered, and transportation to a local emergency medical facility awaited.

If the injury to the worker is chemical in nature (e.g., overexposure), the following first-aid procedures are to be instituted:

- Eye Exposure - If contaminated solids or liquids get into the eyes, wash eyes immediately using large amounts of water and lifting the lower and upper lid occasionally. Obtain medical attention immediately.
- Skin Exposure - If contaminated solids or liquids get on the skin, promptly wash the contaminated skin using soap or mild detergent and water. Obtain medical attention immediately when exposed to concentrated solids or liquids.
- Inhalation - If a person inhales large amounts of a toxic vapor, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

- Swallowing - When contaminated solids or liquids have been swallowed, the Poison Control Center will be contacted and their recommended procedures followed.

9.3 Notification

Checklist

The names and phone numbers of all personnel and agencies that could be involved in emergency responses have been determined. Table 3 provides the notification checklist for use at the St. Louis Park site.

Documentation

The ERT Project Manager will provide a report to the Health and Safety Manager containing the following information regarding any incidents implicating health and safety concerns:

- The event (including date and time) that necessitated the notification and the basis for that decision.
- Date, time, and names of all persons/agencies notified and their response.
- Resolution of the incident (including duration) and the method/corrective action involved.

This report will be submitted within five working days of the resolution of the event.

TABLE 3
NOTIFICATION CHECKLIST
RTCC, ST. LOUIS PARK SITE

In the event of an extraordinary event that might be damaging to personnel or adjacent property, immediate notification of the proper emergency service will be required. The proper emergency service is determined by the nature of the emergency.

EMERGENCY NOTIFICATION

Fire Department	920-2345
Ambulance	920-2345
Police Department	920-2345
Methodist Hospital	932-5000
Poison Control Center	347-3141

Directions to Methodist Hospital: From the site on Louisiana Ave., south to highway 7 (approximately 0.2 mile). Go east on highway 7 to Brunswick Ave. (approximately 0.6 mile). Turn right on Brunswick and proceed south to Excelsior Blvd. (approximately 0.8 mile). Turn right on Excelsior and proceed west past Dakota Ave. (approximately 0.2 mile). Methodist Hospital is on the right side of excelsior Blvd., immediately after Dakota Ave. (See attached map).

ERT CONTACTS

Health & Safety Mgr. - Kevin Powers (HSM)	617-369-8910
Project Manager - William Gregg (PM)	617-541-1642

OTHER CONTACTS

MPCA - Douglas J. Robohm	612-296-7288
EPA - Daniel J. Bicknell	312-886-7341
RTCC - John C. Craun	317-248-6426
City of St. Louis Park - James N. Grube.	612-924-2551

NON-RESPONSIVE

© WELL IN WHICH WATER LEVELS WERE MONITORED WITH A DIGITAL
RECORDER DURING PART OF 1978-81

SECTION D
COMMUNITY RELATIONS PLAN

Construction of the source control well at W23 will be undertaken pursuant to the provisions of the Consent Decree and Remedial Action Plan for the Reilly Tar & Chemical Corporation St. Louis Park, Minnesota NPL site. All community relations programs related to this work will be coordinated through the following agencies:

United States	Ms. Judy Beck U.S. Environmental Protection Agency Region V (312) 353-1325
State of Minnesota	Ms. Sharon Brustman Minnesota Pollution Control Agency (612) 296-7769
City of St. Louis Park	Ms. Sharon Klumpp City of St. Louis Park (612) 924-2523

APPENDIX A
HEAD LOSS CALCULATIONS

APPENDIX A
HEAD LOSS CALCULATIONS

The pump size for the W23 source control well is based on the need to pump 50 gpm of water against a head of 185 feet, with some margin for higher pumping rates to make up for down time. The total discharge head of 185 feet is comprised of the following head losses:

<u>Item</u>	<u>Feet of Head</u>
W105 & W23 combined discharge pipe and fittings	5
Net lift head for W23	85
Pipe & fitting losses for W23	14
Equipment losses for W105	81

	185

The pipe and fitting losses were calculated using standard friction factors. The equipment losses are comprised of 21 feet of head loss across the backflow preventer, 25 feet across the flow meter and 35 feet across the flow controller.

There are no previous direct measurements in well W23 conducted during a pumping test in the Prairie du Chien-Jordan Aquifer that can be used to calculate an expected pumping level in W23 when it is reconstructed and pumped at a monthly average rate of 50 gpm. However, there are data available that allow the pumping level to be estimated with a high degree of confidence. The evidence comes from many water level measurements made in well W23 before it was investigated beginning in 1982 and from experience with other Prairie du Chien-Jordan wells in the area.

Table 1 reproduces water level data collected at well W23 by the USGS from July 13, 1978 to July 7, 1979. During this period W23 was open to the Prairie du Chien-Jordan and St. Peter Aquifers, -- and possibly the Platteville Aquifer as well -- and water level elevations varied from about 855 to 860 feet. During this time, approximately 150 gpm of water was leaking into the well through holes in the casing adjacent to the basal St. Peter Formation, and was leaving W23 through holes in the casing adjacent to the Prairie du Chien Formation. U.S. Geological Survey Water-Supply Paper 2211 describes the condition of well W23 at this time and the effects of that condition on water level measurements.

Water level measurements made in well W23 from 1979 to 1981 are presented in Table 2 and 3. During this time, a packer in the well separated the Prairie du Chien-Jordan Aquifer from above-lying aquifers. The water level measurements in Table 2 represent the Prairie du Chien-Jordan Aquifer, and the water levels in Table 3 are for the St. Peter and possibly Platteville Aquifers. These data indicate that upon cessation of the 150 gpm flow being injected into the Prairie du Chien-Jordan Aquifer, the water level dropped approximately 35 feet. This situation is analogous to a 35-foot drawdown when pumping well W23 at 150 gpm in the Prairie du Chien-Jordan Aquifers. This implies a drawdown of about 12 feet at a 50 gpm rate. This is a conservative estimate because the well hydraulics have probably been much improved by the previous investigative work done on W23, including scouring the borehole adjacent to the Jordan Sandstone and removing the original 7-inch casing adjacent to the Prairie du Chien Formation.

Another approach to predicting the drawdown in well W23 is to examine the specific capacities of other Prairie du Chien-Jordan wells in the area. Data for SLP municipal wells completed in this aquifer are given in Table 4. The specific capacities range from 12 to 46 gpm per foot of drawdown. Based on these specific capacities, pumping W23 at 50 gpm should produce only about 1 to 4 feet of drawdown.

Table 2 shows that water level elevations in W23 ranged from approximately 820 to 840 feet during 1979, 1980 and 1981. The design elevation of the W23 discharge line below the pumphouse is about 890 feet (180 feet by St. Louis Park datum - see drawing no. 861737-300). This elevation minus the low range static water level plus an assumed drawdown of 15 feet yields a net head lift of 85 feet ($890 - 820 + 15 = 85$). The 15-foot assumed drawdown is very conservative compared to the range of 1 to 4 feet predicted from specific capacities of other Prairie du Chien-Jordan wells in St. Louis Park. The predicted water level during pumping that results from these calculations is 805 to 825 feet, which is 69 to 89 feet below the ground surface elevation of 894 feet (184 feet by St. Louis Park datum - see drawing no. 861737-300). In order to ensure that the pump stays submerged, it will be installed at an approximate depth of 120 feet.

U.S. DEPT. OF INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISIONGROUND WATER SITE INVENTORY
WATER-LEVEL DATAAquifer Asp - Cj
M.P. elev. ~~444.44~~
Stickup ~~444.44~~WELL NO. W 23
MP HEIGHT _____

9402748

Site Ident. No. 445625093221401

R = 234 *

T = A *

DATE	WATER LEVEL (BELOW LSD)	STATUS	METHOD	HOLD	CUT	DEPTH BELOW MP	REMARKS	DATE UNCHG	DATE ENTERED
235 # 01/08/1979 *	237 - 32.064 *	238 - *	239 - *	41.00	7.59	33.41	1242 GMS	76.06	
235 # 1/1/1979 *	237 - 32.088 *	238 - *	239 - *	34.00	7.59	33.41		76.06	
235 # 02/07/1979 *	237 - 33.016 *	238 - *	239 - *	34.00	0.00	33.00	100 GMS	60.00	
235 # 03/15/1979 *	237 - 33.007 *	238 - *	239 - *	38.00	2.14	35.86	120 GMS	70.00	
235 # 03/26/1979 *	237 - 32.051 *	238 - *	239 - *	38.00	2.70	35.30	161 GMS	71.00	
235 # 04/12/1979 *	237 - 34.032 *	238 - *	239 - *	35.00	0.13	34.87	134 GMS	85.31	
235 # 04/12/1979 *	237 - 35.098 *	238 - *	239 - *	41.79	1.57	38.43	134 GMS	87.65	93
235 # 04/18/1979 *	237 - 33.090 *	238 - *	239 - *	40.00	3.65	36.35	1145 GMS	75.93	
235 # 05/02/1979 *	237 - 32.098 *	238 - *	239 - *	40.00	4.57	35.43	1145 GMS	76.00	
235 # 05/04/1979 *	237 - 34.025 *	238 - *	239 - *	45.00	8.80	36.20	1545 PEF	85.38	
235 # 05/04/1979 *	237 - 34.088 *	238 - *	239 - *	45.00	7.67	37.33	1545 PEF	85.75	
235 # 05/15/1979 *	237 - 32.065 *	238 - *	239 - *	45.00	9.90	35.10	1040 PEF	76.00	
235 # 05/25/1979 *	237 - 33.093 *	238 - *	239 - *	47.00	10.62	36.38	8830 PEF	75.70	
235 # 06/05/1979 *	237 - 39.038 *	238 - *	239 - *	42.50	1.67	41.83	1207 MFS	85.25	
235 # 06/12/1979 *	237 - 38.065 *	238 - *	239 - *	53.00	10.90	41.10	1545 PEF	85.98	
235 # 06/20/1979 *	237 - 37.024 *	238 - *	239 - *	75.00	35.31	39.69	1410 GMS	85.39	
235 # 07/09/1979 *	237 - 36.062 *	238 - *	239 - *	43.00	3.93	39.07	1115 GMS	85.01	
235 # 08/15/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						
235 # 1/1/1979 *	237 - 10.1 *	238 - *	239 - *						

DRAFT

CONFIDENTIAL PURSUANT
TO COURT ORDERMethod of
Measurement

239 =	A	C	E	G	H	L	M	R	S	T	V	Z
	airline	calibrated	estimated	pressure	calibrated	geophysical	manometer	reported	steel	electric	calibrated	other
	airline	airline		gauge	pressure gauge	logs			tape	tape	electric tape	

Site Status

238 =	D	E	F	G	H	O	P	R	S	T	V	X	Z
	dry	flowed	flowing	nearby	nearby	obstruction	pumping	recently	nearby	nearby	foreign	surface-water	other
		recently		flowing	recently			pumped	pumping	recently	substances	effect	
					flowing					pumped			

Main water site. Republic

GPH: 1976 OL-

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
WATER-LEVEL DATA

MP elev 894.49
Stickup 0.77

WELL NO. *W-23*

MP HEIGHT 894-15

Osp-Ein

9402747

Site Ident. No.

R = 234 *

T =	A	*
-----	---	---

MAIN WELL ON SITE

161

[illegible]

Method of Measurement	239 =	A	C	E	G	H	L	M	R	S	T	Z
		airline,	calibrated,	estimated,	pressure,	calibrated,	geophysical,	manometer,	reported,	steel,	electric,	other
		airline			gage	pressure	logs			tape	tape	

Site Status	: 38 =	D	G	H	Ø	P	R	S	T	Z	
		dry,	flowing,	nearby,	nearby,	obstruction,	pumping,	recently,	nearby,	nearby,	other
				flowing	recently			pumped	pumping	recently	
					flowing						

Creosote plant site W of Louisiana, +
a loop 250 yds N of Lualaba. Wall
50 ft. NW of tree line
which is W of loop

U.S. GOVERNMENT PRINTING OFFICE: 1975 O 545

Table 1
(cont'd)

U.S. DEPT. OF INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

MP elevation = 896,930 WELL NO. 1473 A

MP HEIGHT 3.20

GROUND WATER SITE INVENTORY
WATER-LEVEL DATA

2402749

Site Ident. No.

R-234 *

T- A *

D. TE	WATER LEVEL (BELOW LSD)	STATUS	METHOD	HOLD	CUT	DEPTH BELOW MP	REMARKS	DATE PUNCHED	DATE ENTERED
235 # 20/1/1979 *	237 - 72.066 *	238 - *	239 - *	77.50	1.54	75.96	1200 GBS	820.11	48.
235 # 20/1/1979 *	237 - 72.049 *	238 - *	239 - *	76.50	0.71	75.79	1200 GBS	820.11	48.
235 # 20/1/1979 *	237 - 70.096 *	238 - *	239 - *	83.00	8.74	74.26	1400 GBS	820.11	48.
235 # 8/9/1979 *	237 - 74.082 *	238 - *	239 - *	90.00	11.88	78.12	1630 shaft PEF	820.11	48.
235 # 10/1/1979 *	237 - 70.009 *	238 - *	239 - *	90.00	16.61	73.39	1645 PEF	820.11	48.
235 # 10/1/1979 *	237 - 70.009 *	238 - *	239 - *	80.00	6.57	73.43	1730 JMH, PEF	820.11	48.
235 # 10/1/1979 *	237 - 64.032 *	238 - *	239 - *	79.00	11.38	67.62	1600 GBS	829.31	48.
235 # 10/1/1979 *	237 - 64.016 *	238 - *	239 - *	80.00	12.54	67.46	1055 GBS, JMH	829.47	48.
235 # 11/1/1979 *	237 - 62.091 *	238 - *	239 - *	67.00	0.79	66.21	1420 GBS	830.72	39.
235 # 11/1/1979 *	237 - 63.046 *	238 - *	239 - *	75.00	8.24	66.76	1530 PEF	830.17	39.
235 # 12/1/1979 *	237 - 66.010 *	238 - *	239 - *	71.00	1.60	69.40	1500 GBS, JMH	829.31	39.
235 # 9/1/1980 *	237 - 62.047 *	238 - *	239 - *	66.50	0.73	65.77	1000 GBS	831.11	39.
235 # 11/1/1979 *	237 - 63.096 *	238 - *	239 - *	73.00	5.24	67.76	1045 GBS, JMH	829.31	39.
235 # 11/1/1979 *	237 - 63.034 *	238 - *	239 - *	68.00	1.36	66.64	0950 JMH	829.31	39.
235 # 11/1/1979 *	237 - 63.039 *	238 - *	239 - *	68.00	1.31	66.69	1015 GBS, JMH	829.31	39.
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # 10/1/1979 *	237 - 69.062 *	238 - *	239 - *	90.00	6.98	73.02	1300 PEF, JMH		
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						
235 # / / / *	237 - . . . *	238 - *	239 - *						

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GPO: 1976 CL-24-152

Method of Measurement 2 9 = A C E G H L M R S T V Z
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated other
airline gage pressure gage logs tape tape electric tape

Site Status 2 8 = D E F G H O P R S T V X Z
dry, flowed flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, foreign, surface-water, other
recently flowing recently flowing pumped pumping pumped recently pumped substances effect

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
WATER-LEVEL DATA

AQUIFER *Op*
M.P. Elev. 896.93

WELL NO. *W23A*

MP HEIGHT *3.30*

Site Ident. No. *445625093221602*

R = 234 *

T = A *

W.C.
Elev

DATE	WATER LEVEL (BELOW LSD)	STATUS	METHOD	HOLD	CUT	DEPTH BELOW MP	REMARKS	DATE PUMPED	DATE ENTERED
235 # 01/15/1980 *	237 = 62.47 *	238 = *	239 = S *	66.50	0.73	65.77	1000 GAS	831.16	
235 # 02/11/1980 *	237 = 63.84 *	238 = *	239 = S *	68.50	1.36	67.14	1615 GAS	829.79	
235 # 03/11/1980 *	237 = 64.16 *	238 = *	239 = S *	68.00	2.02	65.98	0000 GAS	830.00	
235 # 03/19/1980 *	237 = 64.149 *	238 = *	239 = S *	70.00	2.21	67.79	1515 JMM	830.14	
235 # 04/01/1980 *	237 = 63.03 *	238 = *	239 = S *	68.00	1.67	66.33	1310 JMM	830.60	
235 # 04/21/1980 *	237 = 71.52 *	238 = *	239 = S *	78.00	3.21	74.82	1530 JMM	822.14	
235 # 10/01/1980 *	237 = 64.146 *	238 = *	239 = S *	76.00	8.24	67.76	1500 GAS	827.17	
235 # 10/11/1980 *	237 = 62.55 *	238 = *	239 = S *	70.00	4.15	65.85	1150 GAS	821.57	
235 # 01/21/1980 *	237 = 68.59 *	238 = *	239 = S *	74.00	2.11	71.89	1645 GAS JMM	821.04	
235 # 01/11/1980 *	237 = 69.148 *	238 = *	239 = S *	82.00	9.27	72.78	1517 GAS JMM	821.15	
235 # 11/01/1980 *	237 = 58.316 *	238 = *	239 = S *	68.00	6.34	61.66	1600 GAS	829.27	
235 # 11/21/1980 *	237 = 58.94 *	238 = *	239 = S *	65.00	2.76	62.24	0760 GAS	834.69	
235 # 03/01/1981 *	237 = 56.89 *	238 = *	239 = S *	63.00	2.81	60.19	1610 GAS	836.74	
235 # 04/01/1981 *	237 = 60.127 *	238 = *	239 = S *	65.00	1.43	63.57	1150 GAS	833.36	
235 # 01/21/1981 *	237 = 57.85 *	238 = *	239 = S *	62.00	0.85	61.15	1350 GAS	835.78	
235 # 06/11/1981 *	237 = 66.118 *	238 = *	239 = S *	70.00	0.52	69.48	1530 GAS	827.45	
235 # 06/30/1981 *	237 = 64.118 *	238 = *	239 = S *	68.00	0.52	67.48	1015 GAS	829.45	
235 # 07/24/1981 *	237 = 66.161 *	238 = *	239 = S *	73.00	13.09	69.91	1650 GAS	827.02	
235 # 08/24/1981 *	237 = 66.118 *	238 = *	239 = S *	69.00	0.52	68.48	1300 GAS	828.48	
235 # 09/21/1981 *	237 = . . . *	238 = *	239 = S *	61.00	6.36	60.64	1245 GAS	836.29	
235 # 10/11/1981 *	237 = . . . *	238 = *	239 = S *	55.00	0.44	54.56	1030 GAS	842.37	
235 # 11/31/1981 *	237 = . . . *	238 = *	239 = S *	62.00	0.67	61.33	1230 GAS	835.51	
235 # 12/4/1981 *	237 = . . . *	238 = *	239 = S *	65.00	1.43	63.57	1155 GAS	835.76	
235 # 05/01/1981 *	237 = . . . *	238 = *	239 = S *	65.00	0.37	64.63	1400 GAS	835.76	
235 # 01/12/1980 *	237 = . . . *	238 = *	239 = S *	77.00	1.96	75.04	1600 JMM	821.67	
04/01/1980	237 = . . . *	238 = *	239 = S *	70.00	3.54	66.46	1140 JMM	820.47	

Method of Measurement 239 = A C E G H L M R S T Z
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, other
airline gage pressure gage logs tape

Site Status 238 = D G H P R S T Z
dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, other
flowing recently flowing pumped pumping recently

WELL NO. 10 23 0
MP HEIGHT _____

3.38

U.S. DEPT. OF INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
WATER-LEVEL DATA

9402750

Site Ident. No. 19

R = 234	*
---------	---

T =	A	*
-----	---	---

[illegible]

**CONFIDENTIAL PURSUANT
TO COURT ORDER**

DRAFT

GPO : 1976 OL-214-15

Method of Measurement	39 =	A	C	E	G	H	L	M	R	S	T	V	Z	
		airline,	calibrated, airline	estimated,	pressure, gage	calibrated, pressure gage	geophysical, logs	manometer,	reported,	steel, tape	electric, tape	calibrated, electric tape	other	
Site Status	38 =	D	E	F	G	H	Ø	P	R	S	T	V	X	Z
		dry,	flowed, recently	flowing,	nearby, flowing	nearby, recently flowing	obstruction,	pumping,	recently, pumped	nearby, pumping	nearby, recently pumped	foreign, substances	surface-water, effect	other

Table 3

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
WATER-LEVEL DATA

AQUIFER Osp
M.P. Elev. 897.01

WELL NO. 6023E
MP HEIGHT 3.38

Site Ident. No. 445625 093221 603

R = 234 * T = A *

DATE	WATER LEVEL (BELOW LSD)	STATUS	METHOD	HOLD	CUT	DEPTH BELOW MP	REMARKS	DATE PUMPED	DATE ENTERED
235 # 2/1/7/1980 *	237 = 24.42 *	238 = *	239 = S *	30.00	0.20	29.80	1005 GBS	867.21	
235 # 2/1/4/1980 *	237 = 27.021 *	238 = *	239 = S *	31.00	0.41	30.59	1670 GBS	866.40	
235 # 07/1/5/1980 *	237 = 26.025 *	238 = *	239 = S *	31.00	1.37	29.63	1100 GBS	866.40	
235 # 03/1/1/1980 *	237 = 25.036 *	238 = *	239 = S *	36.00	7.28	28.74	1530 JMM	868.51	
235 # 04/1/1/1980 *	237 = 25.012 *	238 = *	239 = S *	35.00	6.50	28.50	1322 JMM	867.51	
235 # 04/2/1/1980 *	237 = 30.014 *	238 = *	239 = S *	37.00	3.48	33.52	1607 JMM	867.49	
235 # 10/1/8/1980 *	237 = 25.065 *	238 = *	239 = S *	34.00	4.97	29.03	1020 GBS	867.20	
235 # 05/1/3/1980 *	237 = 31.096 *	238 = *	239 = B *			35.34	1200	867.20	
235 # 05/1/4/1980 *	237 = 32.038 *	238 = *	239 = S *	37.00	1.11	35.76	1500 JMM	867.20	
235 # 06/1/2/1980 *	237 = 32.044 *	238 = *	239 = S *	59.00	23.18	35.82	1645 JMM	867.20	
235 # 11/1/4/1980 *	237 = 24.084 *	238 = *	239 = S *	30.00	1.78	28.22	1555 GBS	868.79	
235 # 12/1/6/1980 *	237 = 28.030 *	238 = *	239 = S *	33.00	1.32	31.68	1130 GBS	867.20	
235 # 01/1/0/1981 *	237 = 26.064 *	238 = *	239 = S *	36.00	5.98	30.02	1700 GBS	867.20	
235 # 02/1/7/1981 *	237 = 27.033 *	238 = *	239 = S *	33.00	2.29	30.71	1600 GBS	867.20	
235 # 03/1/3/1981 *	237 = 25.043 *	238 = *	239 = S *	30.00	1.19	28.81	1100 GBS	868.20	
235 # 04/1/23/1981 *	237 = 27.083 *	238 = *	239 = S *	32.00	0.79	31.21	1145 GBS	868.40	
235 # 04/1/9/1981 *	237 = 29.096 *	238 = *	239 = S *	35.00	1.46	33.54	1410 GBS	867.17	
235 # 06/1/0/1981 *	237 = 26.093 *	238 = *	239 = S *	31.00	0.79	30.21	1555 GBS	868.20	
235 # 06/1/30/1981 *	237 = 28.041 *	238 = *	239 = S *	32.00	0.21	31.79	1035 GBS	868.22	
235 # 07/1/2/1981 *	237 = 26.049 *	238 = *	239 = S *	31.00	1.13	29.87	1710 GBS	867.19	
235 # 08/1/24/1981 *	237 = 29.022 *	238 = *	239 = S *	33.00	0.40	32.60	1345 GBS	867.19	
235 # 09/1/5/1981 *	237 = . . . *	238 = *	239 = *	29.00	0.75	28.25	1250 GBS	868.76	
235 # 10/1/0/1981 *	237 = . . . *	238 = *	239 = *	28.00	0.44	27.06	1815 GBS	869.95	
235 # . . . *	237 = . . . *	238 = *	239 = *						
235 # . . . *	237 = . . . *	238 = *	239 = *						

Method of Measurement 231 = A B C E G H L M R S T Z
 airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, other
 record, gage, pressure gage, logs, tape, tape

Site Status 233 = D G H P R S T Z
 dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, other
 flowing, recently, flowing, pumped, pumping, recently

Table 4

CITY OF ST. LOUIS PARK

<u>WELL #6</u>				
<u>Date</u>	<u>Static</u>	<u>Pumping</u>	<u>Drawdown</u>	<u>Gallons Per Minute</u>
9 - 69	123'	155'	32'	1050
5 - 81	120'	150'	30'	1050
3 - 82	102'	142'	40'	1050
5 - 83	98'	133'	35'	1050
7 - 83	104'	135'	31'	1050
11 - 83	95'	142'	47'	1050
2 - 84	98'	134'	36'	1050
8 - 84	130'	158'	28'	1050
9 - 86	101'	131'	30'	1050
11 - 86	104'	146'	42'	1050
12 - 86	103'	144'	41'	1050 Ave.-36'
1050 gpm ÷ 36' = 29 gpm/ft drawdown				
<u>WELL #7</u>				
9 - 69	91'	118'	27'	1000 Ave.-40'
9 - 86	87'	140'	53'	1000
1000 gpm ÷ 40' = 25 gpm/ft drawdown				
<u>WELL #8</u>				
9 - 69	131'	149'	18'	1150
5 - 83	117'	144'	26'	1150
7 - 83	118'	143'	24'	1150
11 - 83	114'	141'	27'	1150
8 - 84	143'	177'	34'	1150
4 - 85	122'	146'	24'	1150
9 - 86	118'	146'	28'	1150
11 - 86	124'	148'	24'	1150
12 - 86	124'	148'	24'	1150 Ave.-25'
1150 gpm ÷ 25' = 46 gpm/ft drawdown				

CITY OF ST. LOUIS PARK

WELL #9

<u>Date</u>	<u>Static</u>	<u>Pumping</u>	<u>Drawdown</u>	<u>Gallons Per Minute</u>
9 - 69	91'	118'	27'	1000 Ave.-39'
9 - 86	80'	132'	52'	1000
1000 gpm ÷ 39' = 26 gpm/ft drawdown				

WELL #10

6 - 66	118'	142'	24'	1100 Ave.-44'
9 - 86	107'	141'	34'	1100
11 - 86	111'	170'	59'	1100
12 - 86	111'	170'	59'	1100
1100 gpm ÷ 44' = 25 gpm/ft drawdown				

WELL #14

9 - 69	116'	129'	13'	1000 Ave.-86'
3 - 82	89'	199'	110'	1000
5 - 83	108'	168'	60'	1000
7 - 83	107'	168'	61'	1000
11 - 83	80'	217'	137'	1000
2 - 84	85'	207'	122'	1000
4 - 85	93'	217'	124'	1000
9 - 86	107'	168'	61'	1000
1000 gpm ÷ 86' = 12 gpm/ft drawdown				

WELL #15

9 - 86	102'	155'	53'	1000
11 - 86	103'	175'	72'	1000
12 - 86	103'	176'	73'	1000
1000 gpm ÷ 66' = 15 gpm/ft drawdown Ave.-66'				

WELL #16

5 - 81	123'	183'	60'	1000
3 - 82	119'	179'	60'	1000
5 - 83	114'	192'	78'	1000
7 - 83	115'	193'	78'	1000
2 - 84	116'	177'	61'	1000
8 - 84	139'	200'	61'	1000
9 - 86	113'	177'	64'	1000 Ave.-66'
1000 gpm ÷ 66' = 15 gpm/ft drawdown				

APPENDIX B
CONTRACT SPECIFICATIONS

CONTRACT SPECIFICATIONS

FOR

WELL 23

PRAIRIE DU CHIEN-JORDAN AQUIFER

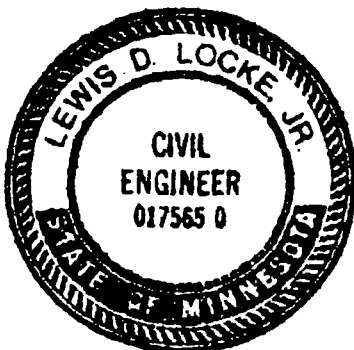
SOURCE CONTROL

REILLY TAR & CHEMICAL CORP.

1510 MARKET SQUARE CENTER

151 NORTH DELAWARE STREET

INDIANAPOLIS, IN 46204



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Lewis D. Locke, Jr.

Date OCT 31 1986

Reg. No. 017565 0

PUMPING FACILITY ENGINEERING SPECIFICATIONS

CONTENTS

Summary of Work	Sec.	100
Mechanical Work	Sec.	200
Electrical Work	Sec.	300
Painting	Sec.	400
Driveway and Entry Walk	Sec.	500
Building.	Sec.	600
Discharge Pipe and Gravity Drain.	Sec.	700

SECTION 100

SUMMARY OF WORK

101 SCOPE OF WORK

The work consists of the complete finish of the Well 23 Prairie Du Chien-Jordan Aquifer, Source Control Pump House at _____ Louisiana St., St. Louis Park, MN. The work is to be completed as per this specification and Reilly Tar & Chemical Corp. drawings 861737-001, 300 and 600.

102 OWNER RESPONSIBILITIES

The Owner will have a Representative available for field Consultation.

The Owner will furnish site elevations prior to letting the work for bids.

The Owner will furnish all required construction and permanent permits.

103 CONTRACTOR RESPONSIBILITIES

The Contractor will supply the Owner with a schedule of construction before the work begins and with a revised and updated schedule weekly as the work progresses.

The Contractor will arrange for a temporary water supply and temporary electrical service connection during the construction period.

The Contractor shall provide project management to ensure completion of the work on schedule.

The Contractor will be responsible for base lines and bench marks for subcontractor use.

The Contractor must notify the Owner 3 days in advance of any utility tie-in or any work that will interrupt normal activity around the job site.

Coordination between the Contractor and the Subcontractors must be maintained in order to meet the schedule.

All applicable Codes and Safety Regulations will be followed by every Contractor and his workers.

The Contractor shall provide five copies of all equipment warranties, operating instructions, installation instructions, maintenance instructions and parts list for each piece of equipment installed shall be provided to the owner on completion of the work.

The Contractor shall provide temporary barricades and fencing.

The Contractor shall ensure that at the end of each working day, positive drainage shall be provided.

The Contractor shall ensure that the topsoil is removed to its entire depth, in the areas of new construction and stockpile topsoil which will be required for finish grading.

The Contractor shall see that areas that are to have topsoil removed shall first be cleared of excessive vegetation, rubbish and debris.

The Contractor shall see that stockpiled topsoil is replaced in lawn areas prior to sodding and or seeding to a minimum depth of 6 inches. Remove all stones larger than 2 inches.

The Contractor will be responsible for site restoration to near original condition. Sod shall be placed where necessary to return site to original conditions or to prevent erosion otherwise graded areas shall be seeded.

The Contractor shall be responsible for layout of his Work, including lines and elevations. Each Subcontractor shall field verify all dimension relating to his work, as shown on the Drawings, and report any errors or discrepancies to the General Contractor before commencing work.

The Contractor is responsible for the protection of his Work from adverse weather. He shall provide, at all times, all means and methods for weather protection as necessary for the satisfactory execution and performance of his work.

104 GUARANTEES

A written one year guarantee is required to cover all installed material, equipment and labor not otherwise covered by manufacturers warranties. Exceptions to this are the roof (2 yrs) and caulking (5 yrs).

All guarantees will begin at the Owners recognized date of substantial completion.

105 TEMPORARY FACILITIES

The Contractor will furnish a project office at the site with a telephone for business use to all personnel. Toilet facilities will be provided by the Contractor.

Storage facilities are to be provided by the Contractor. Set-up location must be approved by the Owner. If the set-up location interferes with work later in the job, relocation may be required.

The Electrical Subcontractor will furnish all temporary electrical for lights and outlets at the beginning of the job. This temporary work is to be included in the Contract Bid. This work must meet the appropriate codes and regulations.

The Electrical Subcontractor is also responsible for removal of this equipment when no longer needed.

Fire extinguishers will be provided by the Contractor at required locations on the job site. Each Subcontractor is responsible for providing his own extinguishers during any cutting or welding. Certain Owner designated locations will require Owner approval before welding or cutting can be done.

Project Sign: If required, the Contractor will provide and maintain a Project Sign as approved by the City and the Owner. No other signs are allowed except as required for safety, security, or traffic control; or without the permission of the Contractor.

106 MEETINGS

Prior to Contract award, the leading Bidder will be required to attend a pre-award meeting. At this time the bid and all applicable Contract

Document information will be reviewed. A preliminary schedule will be provided for Contractor input. The Contractor should also be ready to provide information on Subcontractors, Suppliers, material and equipment delivery times, personnel etc.

At any time during the job, the Owner may call a progress meeting in the St. Louis Park area. These meetings may require attendance by the Contractor, Subcontractors and Material Suppliers.

107 SHOP DRAWINGS

Shop drawings and product data must be received by the Owner with sufficient time for approval. Contractor or Supplier delay in forwarding drawings and data for approval will not be viewed as an acceptable reason for schedule extension.

Seven (7) copies of all approved drawings and data will be supplied to the Owner for further distribution.

108 CLEAN-UP

The Contractor and each Subcontractor will be responsible for site clean-up during the job. A trash container will be supplied by the Contractor.

109 PROJECT CLOSEOUT

The Mechanical and Electrical Subcontractors must submit five (5) sets of operating and maintenance manuals to the Owner before final payment will be made. These manuals will contain the following:

- Contractor and Supplier List
- Guarantees
- Wiring and control diagrams
- Operating instructions
- Maintenance instructions
- Parts lists
- Any other information relating to supplied equipment and materials

The Contractor and all Subcontractors must submit a Contractor and Supplier List and a written guaranty.

The Contractor will be responsible for keeping a set of as-built drawings on site for updating changes. It is the responsibility of each Subcontractor to note all changes related to his work on this set.

SECTION 200

MECHANICAL WORK

201 GENERAL

This Section describes work, equipment and materials to be furnished by the Mechanical Subcontractor.

All mechanical systems are to be finished to a ready-to-operate condition. The Mechanical Contractor is responsible for completing all mechanical systems except for power wiring tie-ins.

The accompanying drawings have been drawn to scale and have some listed dimensions. Care has been taken to maintain accuracy, but it remains the Contractors responsibility to verify the scaled and listed dimensions.

The Mechanical Subcontractors Bid shall include a list describing the major types of equipment and materials to be used. After acceptance of the bid, changes to this list will not be allowed.

The Mechanical Contractor will assume all responsibility for conforming to rules and regulations of the applicable government agencies and utilities.

The plumbing installation will comply with all requirements of the Minnesota Department of Health and the Uniform Plumbing code.

The mechanical installation will comply with the Uniform Mechanical Code.

All installed work will comply with rules and recommendations of the National Fire Protection Association.

Shop drawings and operation and maintenance manuals must be supplied as described in the SUMMARY OF WORK.

202 SYSTEM TESTING

Every piping system will be flushed clean prior to pressure testing.

Testing procedures for all piping systems are as follows:

Air Test: The air test shall be made by attaching an air compressor testing apparatus to any suitable opening, and, after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch (5 psi/34.47 kPa) or sufficient to balance a column of mercury 10 inches (254 mm) in height. This pressure shall be held without introduction of additional air for a period of at least 15 minutes. *by approved.*

203 MECHANICAL EQUIPMENT SPECIFICATIONS

Discharge Gate Valve 2" flgd (Powell Fig. 515)

Pressure Gauges (2) 0-100 psi (Ashcroft 1279 (*) 54 1/2"
TA Lower 1/2 NPT 0-100 psi)

Flow Controller 2" flgd (Kates Flow Control KB11F-CDG)

Sample Line Valve and Pressure Gauge Shutoff Valves
1/2" NPT, ball type (Powell Fig. 4210B 1/2")

Flow Meter 2" NPT Hersey (Turbine Meter MVR160-C-I-200-P-G-C
with 1005 pulse to DC converter, manufacturers calibration
records are required for these devises)

Backflow Check Valve 2", spring closing (TRW
Mission Duo Check II K15 HMF 2")

Reduced pressure backflow preventer 2" NPT (FEBCO 825Y with
gate valves)

204 GENERAL PIPING MATERIALS

The Mechanical Contractor is to furnish all piping, valves and accessories to complete the work as described by the Contract Documents. Substitutions may be made for specified items with approval from the owner.

The list of acceptable manufacturers is as follows:

- Gate and check valves: Nibco/Scott, Crane, Powell, Lunken, TRW Mission Heimer, Walworth, Jenkins or Stockman
- Ball valves: Wolverine Brass Works, Nibco/Scott, Hammond, Powell, Jamesbury, Metraflex or Dyna-Quip

All flange connections are to have 1/16" full face "Cranite" gaskets coated with a thread lubricant when installed.

205 GENERAL PIPING INSTALLATION

All piping must be installed and routed in a neat and orderly manner with sufficient clearances for maintenance unless otherwise indicated on the drawings.

206 GAUGES

Acceptable guage manufacturers are Ashcroft, Marsh, Trerice, Duro, Danton, Cambridge, American Air Filter or Dryer.

Typical guages shall be similar to the following:

- Ashcroft 1279

207 DISCHARGE WATER PIPING

Piping will be part low carbon steel galvanized Sch 40 ASTM A120/A53 with screwed and flanged fittings and part polyethylene coated carbon steel Sch 40 ASTM A120 A53 as indicated on the drawings.

208 DRAIN PIPING

Piping will be part no hub cast iron ASA Group 022, ASTM A 74, ANSI A112.5.13, ASTM C564 gasket sleeves, CISPI 310 couplings and part polyethylene coated carbon steel Sch 40 ASTM A120/A53 as indicated on the drawings.

209 GENERAL EQUIPMENT INFORMATION

The Mechanical Subcontractor is responsible for complete purchasing and installation of all equipment other than as noted in the Drawings and Specifications. This work includes supports and all connections except power wiring to the unit.

All equipment is to be completely installed to a ready to operate state, including any lubrication, alignment and adjustments.

SECTION 300

ELECTRICAL WORK

301 GENERAL

This section describes work, equipment and materials to be furnished by the Electrical Subcontractor.

The Electrical Subcontractor will assume all responsibility for conforming to all rules and regulations of the applicable government agencies and utilities.

The Electrical Subcontractor is responsible for verification of dimensions that affect his work. Any minor deviations caused by interferences shall be considered a part of the job and the owner will not be held responsible for any reimbursement.

All electrical equipment must be U. L. approved and meet all other applicable code requirements.

All permits and inspections required for completion of electrical work are to be arranged and paid for by the Owner.

All electrical materials and equipment shown on the Contract Drawing and listed in the Specifications must be provided by the Electrical Subcontractor unless otherwise noted.

Shop Drawings and Operations and Maintenance Manuals must be supplied as described in the SUMMARY OF WORK.

302 TEMPORARY WORK

The Electrical Subcontractor must supply temporary power supply pole and outlets to allow for convenient construction use.

303 ELECTRICAL EQUIPMENT SPECIFICATIONS:

Pump 5 Hp, 3ph, 200V, 60Hz, 17 amps (furnished by Well Contractor)

Nema Size 1 starter (Square D class 8536, type SCW, Nema type 4 with Dual Push Button and pilot light control unit KXRG117, fused 120V control transformer & extra contact)

Hourmeter nonreset type (Redington 7526-002)

One 50 amp circuit breaker disconnect in load center (Square D QO350) 3 pole, common trip with indicator

Heater 5KW, 17,065 Btuh, 208 V, 3ph, 60Hz, 12.5 amps Emerson-Chromalox MUH-05-8 unit heater, MT-1 thermostat, MMB-5 mounting bracket)

One 20 amp circuit breaker disconnect in load center (Square D QO320) 3 pole, common trip with indicator

Lights 2 units each unit having 2 lamps, 120V, 60Hz, 70 watts per fixture, .65 amps per fixture (Graybar Meter Miser Wrap-Arounds GMM-8-2224)

One 15 amp ground fault circuit interrupter circuit breaker disconnect in load center for both lights (Square D QO115GFI) 1 pole with trip indicator

Switch toggle type, 120V, 15 amp (Hubbell 1201 GRY)

Recorder/Totalizer (Chessell Model 390-12-010-10-100 11000 0, manufacturers calibration records are required for this devise)

One 15 amp ground fault circuit interrupter circuit breaker disconnect in load center (Square D QO115 GFI) 1 pole with trip indicator

Duplex Outlet corrosion resistant, 3 wire grounding, 125V 20 amp (Hubbell 53QM62)

One 20 amp ground fault circuit interupter circuit breaker disconnect in load center (Square D QO120 GFI) 1 pole with trip indicator

Loadcenter circuit breaker type, 3ph, 4 wire, 120/208V AC WYE, 100 amp main (Square D QO424M100) flush cover (Square D QOC430LF) Equipment Ground bar kit (Square D PK15GTA)

Safety Socket Box test-bypass type, 3ph, 4 wire, 208Y/120V, 100 amp (Square D EM71NRB)

304 GENERAL MATERIALS

The following types of material and equipment should be used

- | | |
|---|---|
| - Service equipment, panelboards, safety switches, motor starters and other general purpose control devices | - Square D |
| - Wiring devices | - Hubbell, A.H. & H., P. & S. G. E., Sierra, Grouse-Hinds |
| - Finishing plates | - Sierra |
| - Lighting Fixtures | - Noted on Drawings or approved equal |
| - Lamps | - G.E., Sylvania or Westinghouse |

Conduit can be U.L. approved heavy wall rigid or EMT where not otherwise specified. All fittings must be U.L. approved and electrically conductive. Minimum conduit size is 3/4" except where noted. Flexible conduit is 1/2" minimum.

Conduit runs shall be in the block walls and under the concrete floors unless otherwise indicated.

Wire and cable for general wiring shall be rated 600 volt. Conductors size #12 through #8 AWG shall have type THW or THWN insulating wall unless otherwise noted. Conductors sized #6 AWG and larger shall have type XHHW insulating wall unless otherwise noted. Minimum conductor size must be #12 AWG. All wire terminating in light fixtures or at equipment should be heat resisting type. Wire must be sized so that voltage drop does not exceed 3% from branch panel to last outlet. Color coding should be Phase A - Black, Phase B - Red, Phase C - Blue, Neutral - White or Grey and Ground - Green. All wire must be 98% conductability soft drawn commercially pure copper.

Toggle switches and receptacles should have a grey finish. Finishing plates must be brushed stainless steel.

305 GENERAL INSTALLATION

The Electrical Subcontractor is responsible for all power tie-ins required for installed equipment.

All equipment, switches, panels, main circuits and feeder circuits that are installed by the Electrical Subcontractor should be identified by permanent labels.

The Electrical Subcontractor is responsible for all testing required to insure a complete and secure electrical system.

All conduit shall be hidden from view unless noted on drawings or approved by Owner. No runs will be installed diagonally. Conduit ran through outside walls must be sealed with appropriate material.

Wire must not be pulled using grease or oil. Only cable pulling compounds similar to Y - ER - EASE are to be used. Any required splicing will be done using approved splicing procedures and must be approved by Owner.

All wall mounted switch and outlet boxes must be flush mounted unless otherwise noted.

Mounting height of switch and outlet boxes and devices are to be as follow:

- | | |
|----------------------|-------------------|
| - Receptacle outlets | - 40" above floor |
| - Toggle switches | - 48" above floor |

306 HEATER

The Electrical Subcontractor is responsible to furnish, install and wire the electric heater. The heating fixture is to be hung from the wall after the wall and ceiling painting are complete. The unit specified may be replaced with an equal unit. Such a unit shall have a built in thermostat (40° to 85°F range), totally enclosed corrosion resistant elements finned and sheathed, quiet built in fan, totally enclosed motor with sealed bearings automatic-reset thermal cut-out disconnects for element and motor.

307 PANEL BOARD, STARTER AND METER BOX

100 amp, 3ph, 4 wire, 208Y/120 volt meter box is to be supplied and installed by the Electrical Subcontractor, the unit is to be equal to Square D.

Nema Size 1 starter is to be supplied and installed by the Electrical Subcontractor. The unit is to be equal to Square D. It is to be installed after the wall and ceiling painting are complete.

100 amp 120/128 volt circuit breaker panelboard complete with main breaker and listed number of individual breakers is to be supplied and installed by the Electrical Subcontractor. The panel should be equal to Square D.

308 GROUNDING

The conduit system ground must be continuous through all new construction. All equipment must be provided with a suitable ground. Green pigtails and jumpers are to be used with outlets, switches and all flexible conduits. All conduit ground must be tested to insure correct and complete ground and approved by Owner.

309 LIGHTING

The Electrical Subcontractor is responsible to furnish, install and wire all light fixtures. Ceiling fixtures will be hung after ceiling is painted. All ceiling fixtures must be self supporting and also secured to bar joists. All fixtures must be equipped with U. L. heat resistant wiring. Fixtures should have white finish on all metal.

310 SERVICE ENTRANCE WIRING

The service entrance wire size will be #2 AWG. The service entrance conduit will be routed underground to the nearest Power Company pole or ground mounted transformer. The bury depth shall be 18 inches to the center of the conduit. A 2 inch thick by 6 inch wide concrete cover shall be poured in the trench after 6 inches of fill has been compacted over the conduit. A yellow plastic warning tape shall be laid in the trench after 6 inches of soil has been compacted over the concrete cover. The remaining fill shall then be added and compacted. If a ground mounted transformer is to be utilized for the power supply the service entrance conduit shall terminate in the terminal cabinet of the transformer. If a pole mounted transformer is to be utilized for the power supply the service entrance conduit shall extend 12 feet up the pole and have a weather head. The General Contractor will be responsible for coordinating the electrical service connection.

SECTION 400

PAINTING

401 GENERAL

The Painting Subcontractor is responsible to furnish all supplies and labor to paint all interior walls, ceiling, door (interior and exterior), gutters, downspouts, exposed roof flashing, meter box and exposed conduit.

The painting schedule will consist of two segments. All sealing, priming and finish coats will be in the first segment. After other construction is complete touch up will be done.

Care must be taken to protect all adjacent surfaces during preparation and painting. All surfaces should be prepared to paint manufacturers recommendations before painting.

402 MATERIALS AND APPLICATION

Top Coat Paint colors to be used are as follows:

- | | |
|---|---|
| - All exterior metal doors, frames
and meter socket box | - Glidden Professional Colors
Aluminum |
| - All galvanized gutters, flushing,
downspouts and conduit | - Glidden Professional Colors
Aluminum |
| - All interior walls, ceilings, doors
frames and conduit | - Glidden Professional Colors
White |

Paint types to be used are as follows:

- | | |
|--|---|
| - Exterior Primed Surfaces | - (2) coats Glidden #592 |
| - Exterior Galvanized Surfaces | - (2) coats Glidden Epoxy Chromate
Primer #5251/5252 |
| | - (2) coats Glidden #592 |
| - Interior Block | - (1) coat Glidden Ultra Hide Block
Filler #5317 |
| | - (2) coats Glidden Glid Guard
Epoxy #5250/5242 |
| - Interior Ceiling, bar joists and
conduit (all galvanized) | - (2) coats Glidden Epoxy Chromate
Primer #5251/5252 |
| | - (2) coats Glidden Glid Guard
Epoxy #5250/5242 |
| - Interior Primed metal door and
frame | - (1) coat Glidden Universal Fast Dry
Metal Primer #5210 |
| | - (2) Coats Glidden Glid Guard Epoxy
#5250/5242 |

SECTION 500

DRIVEWAY AND ENTRY WALK

501 GENERAL

The Paving Subcontractor is responsible for labor, material and installation of the drive shown on Reilly Tar & Chemical Corp. drawing number 861737-001. The driveway is to be installed to meet the specifications of the City of St. Louis Park. The Paving Subcontractor is also responsible for the pump house entry walk as shown on Reilly Tar and Chemicals Corp. drawing number 861737-600.

All concrete shall be cured for a period of not less than 7 days. During this curing period, no part of the concrete shall be permitted to become dry. Curing shall be applied and maintained to prevent loss of water from concrete for the duration of the curing period.

Fresh concrete shall be protected from heavy rains, flowing water and mechanical injury. All concrete shall be protected from the sun and drying winds.

Sidewalks and other exterior slabs except vehicular traffic areas shall receive a hair broom finish in accordance with ACI 301, Section 1104(d) with a Class B. tolerance.

Exterior concrete slabs shall be cured with Sealtight WP-40 White-Pigmented Concrete Curing Compound as manufactured by W. R. Meadows Elgin, Illinois. or an equal product approved by the Owner. Application for this product shall be 300 square feet per gallon. Product shall meet specifications: ASTM C309, Type 2, Class A; AASHTO M148, Type 2, Class A; ANSI A 37.87, Type 2, Class A.

Concrete testing shall be done on a per truckload basis. Samples shall be taken per ASTM methods and tested by an independent testing laboratory. The laboratory shall be selected by the General contractor and approved by the Owner. The cost of sampling and testing shall be included in the bid price. The owner will evaluate the test results for acceptance or rejection.

SECTION 600

BUILDING

601 GENERAL

This portion of the contract includes the following:

- Foundation construction
- Masonry wall construction
- Wall, roof and floor insulation
- Concrete floor construction
- Brick veneer construction
- Bar joists and decking construction
- Roof scuttle
- Roofing, flashing, nailers, gutters and downspouts
- Door, frame, threshold, hinges, plates and handle
- Lockwork and door closer
- Caulking

All materials and labor required for complete finish are to be included.

All of the Work shall meet the requirement of all governing codes, ordinances, laws, regulations, safety orders and directives.

602 EXCAVATION AND BACKFILL

Provide all equipment, material and labor to excavate for foundations, footings, stoops, sidewalks, curbs, retaining walls and similar items, all to the lines and grades indicated herein and on the drawings.

Excavate to full depth and full width of foundations; allow ample room for forms where required. Excavation shall be held to a true line and grade. Bottom shall be level and free from loose material. Where bottom of footing is undercut, return to grade with concrete of same quality as specified for the footing of foundation.

Promptly backfill excavations as work permits, but not before walls have attained design strength. Shore walls and footings as required to prevent toppling, cracking, and misalignment.

All spaces excavated for and not occupied by structures shall be backfilled to subgrade with excavated materials from the site or bank-run gravel from off-site and thoroughly compacted in layers not to exceed 12" in depth. Backfill shall be compacted to a minimum of 95% of maximum density at optimum moisture content, as determined by Modified Proctor Test (ASTM D-1557). Backfill simultaneously on both sides of the structures.

Excess excavated material not used as backfill, but suitable for site fill, shall be used for site grading as directed by the Contractor.

Excavated material deemed unsuitable for backfilling or fill will be disposed of by the Owner.

Fill material required to complete the finish grading will be bank-run gravel for subgrade and top soil as required to meet the minimum coverage requirement of 6 inches. All additional materials for the building excavation and general site grading shall be provided by the Contractor.

Place granular drainage fill under the slab and compact. Depth of drainage fill shall be minimum 6 inches or as shown on drawings.

Earthwork density tests shall be required for each lift during construction. They shall be made by an independent testing laboratory selected by the Earthwork Subcontractor and approved by the Owner. Field density tests shall be taken at locations selected with a minimum of one per 150 sq. ft. per 2' lift. All tests required to bring compaction to the required density shall be paid for by the Building Earthwork Subcontractor.

603 CONCRETE

This section includes general requirements for the concrete Subcontractor and is intended to supplement the specifications listed on the drawings.

Reinforcing bars shall conform to the requirements of ASTM A-615 "Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement. The grade of steel to be as shown on drawings.

Welded wire fabric shall conform to the requirements of ASTM A-185, "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement".

Expansion Material shall be ASTM D1752, Type III, preformed, self-expanding strips formed of cork particles with a nonbitumen, isolable resin binder, similar to "W.R. Grace Code No. 4324."

Vapor barrier material shall be 6 milpolyethylene ASTM E-96.

All materials and labor required for complete finish are to be included.

All of the Work shall meet the requirement of all governing codes, ordinances, laws, regulations, safety orders and directives.

Provide Expansion Joint Material where indicated on Drawings. Install preformed, self-extending granulated cork strips full depth of joints.

Interior concrete slabs shall be cured with Clear Bond as manufactured by Guardian Chemical Company, Atlanta, Georgia or approved equal by the Owner that can be applied in one coat at the rate of 400 square feet to the gallon and shall meet ASTM C309 (Type 1), TTC-00800 (GSA-Fss), CRD-C-300 and U.S. Corps of Engineers Abrasion Test Method.

Preparation: All work shall be in accordance with ACI-614-59, "Recommended Practice for Measuring, Mixing and Placing Concrete". ACI-614-59 will be republished as ACI-304. All construction debris and extraneous matter shall be removed from within the forms. Struts, stays, bracing and blocks, servicing temporarily to hold the forms in correct shape and alignment, shall be removed. All concrete shall be placed on clean damp surfaces, free from water, or upon properly consolidated fills.

Vibration: Concrete shall be consolidated by means of mechanical vibrating. Vibrators shall be inserted and removed vertically at regular intervals to insure uniform consolidation. In no case shall vibrators be used to transport concrete inside the forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when in operation. At least one standby vibrator shall be on hand at all times.

Cold Weather Batching: No frozen materials or materials containing ice shall be used in cold weather. Temperatures of materials including mixing water, shall not exceed 140°. When placed in forms, the concrete shall have a temperature between 50°F. and 90°F. Work shall be in accordance with ACI-306, "Recommended Practice for Winter Concreting".

Top surface of footings shall receive a floated finish with a Class B tolerance (1/4 inch in 10 feet).

All interior floor slabs shall receive a troweled finish in accordance with ACI 301, Section 1104(c) with a Class A tolerance (1/8 inch in 10 feet).

All concrete shall be cured for a period of not less than 7 days. During this curing period, no part of the concrete shall be permitted to become dry. Curing shall be applied and maintained to prevent loss of water from concrete for the duration of the curing period.

Fresh concrete shall be protected from heavy rains, flowing water and mechanical injury. All concrete shall be protected from the sun and drying winds.

604 HARDWARE SPECIFICATIONS

Door lockset (To match existing City Utility Dept. Facilities and keyed alike)

Roof Scuttle Pad Lock (Master, keyed to City Utility Dept. System)

Door Closer (Yale Series 50, standard door closer #54)

Door Hinges (3) Full Mortise, standard weight, wrought steel, Anti-friction ball bearing, non rising pin, flush tip, Non-Removable Pins, Satin Chrome finish (Stanley FBB179-26D-NRP)

Roof Scuttle (Bilco Type S-50)

605 MASONRY WALL CONSTRUCTION

The door opening shown on the drawing is to have a reinforced lintel. Construction materials should be 6" & 12" ASTM C90, Grade N, Type 1 hollow core block and Type S mortar.

Face brick shall be standard size (2-1/4" x 3-3/4" x 8"), grade SW, conforming to ASTM designation C216. Color and style to be specified by the Owner.

Wall reinforcing shall be truss type, 9 gauge steel wire conforming to ASTM A82, with side rods deformed. Placed as shown on drawings. Standards: Truss-Mesh (Hohmann & Barnard) - Dur-O-Wall (Dur-O-Wall Mfg. Co.) - Keywall Truss (Keystone).

Mortar joints which are to be exposed or painted shall be struck off flush with the wall surface and when the mortar is partially set, shall be firmly compacted with a round jointing tool. Mortar joints in the face of walls to be covered shall be struck off flush with the face of the wall.

The Masonry Subcontractor shall cooperate with all trades and be responsible for cutting, patching and building-in all work as required.

The door frame is to be grouted

Set and build-in flashings and counter flashings, expansion joints, frames, sleeves, lintels, and anchor inserts, furnished under other Sections, which are incidental to, or support masonry.

Anchors embedded in masonry shall be furnished and installed by the Masonry Contractor. Size and spacing will be shown on drawings.

Flashing, expansion and control joints shall be built-in to masonry and placed as the work progresses. Provide weep holes 24" o.c. at bottom of walls (floor line) and bottom of flashings.

Exterior brick and stone walls above grade shall receive silicone or stearate water-repellent, applied in accordance with manufacturer's instructions. Standards: Toch Brothers - Supertox; Sonneborn S-X Hycon; Toch Brothers Limestone Supertox; Sonneborn Hydrocide Unipel.

All permanently exposed masonry walls, including partitions shall be thoroughly cleaned down on completion, damaged surfaces repaired or replaced and mortar joints pointed to leave the work in a condition acceptable to the Owner. Cleaning and pointing shall be started at the top and worked down. Cleaning of MASONRY, except concrete block and stone, shall be done with fiber brushes using soap powder boiled in water, adding clean, sharp, fine sand to the soap and water mixture where necessary. Excess MORTAR STAINS shall be removed and the entire surfaces rinsed with clean water. Cut out defective mortar joints where necessary and fill the crevices solidly with mortar and tool as specified. EXPOSED CONCRETE BLOCK to be rubbed with stone to eliminate excess mortar. Point up all surfaces and leave walls in a condition acceptable to the Owner.

No masonry work shall be permitted when the temperature is less than 32 degrees F. or below 40 degrees F. and falling, unless the following precautions are taken:

1. Below 40 degrees F. but above 32 degrees F.: Heat mortar mixing water, but not above 160 degrees F. Plastic sheets or tarpaulins shall be placed over the newly laid walls.
2. Below freezing, but above 0 degrees F.: In addition to the preceding requirements, sand shall be heated, but not scorched. The working area shall be enclosed with protective coverings and artificial heat shall be provided. When the temperature falls below 20 degrees F., all concrete masonry units shall be heated to at least 50 degrees F. at the job site by the Contractor.
3. Below 0 degrees F.: Construction shall be stopped unless the enclosure is complete and tight. Observe all preceding requirements.

Masonry shall be protected against freezing for at least 48 hours.

No masonry shall be laid with or on frozen materials.

606 SUPPLY AND INSTALL DOOR

Hollow metal door and frame are to be supplied and installed. Doors are to be Steelcraft Corp. or approved equal. Door and frame are to be factory primed. Frame is to be grouted. The door is to be fitted with a top cap.

The frame is to be checked for level during construction to assure it remains plumb.

Finish hardware shall be equal to the following:

- | | |
|---------------|--------------------------------|
| - Hinges | - Hager, Stanley, McKinney |
| - Door closer | - Sargent & Co., Yale |
| - Threshold | - National Guards Products Co. |
| - Butts | - The Stanley Works |

607 SUPPLY AND INSTALL LOCKWORK

The lockwork to be used is as follows:

- | | |
|----------------|--|
| - Door | - To match existing city installations |
| - Roof Scuttle | - Master, pad lock |

All lockwork except padlock is to be satin chrome and be keyed to meet City of St. Louis Park specifications.

608 CAULKING

Provide all labor, materials, and equipment necessary for complete caulking work as shown on drawings and specified herein.

All caulking work shall be performed by an experienced, competent Caulking Contractor as per requirements herein.

Interior Caulking: same as exterior.

Exterior Caulking: shall be of a color to closely match the mortar color, 2 part polysulfide base (Thiokol) sealant material meeting requirement of American Standard Specifications for Sealing Compounds for the Building Trade, A116.1 1960 of Shore A or approved equal.

Primer: colorless by caulking manufacturer.

All materials shall be used in accordance with their manufacturer's latest printed instructions.

Caulk expansion joints, control joints, and around entire perimeter of doors and other openings and joints where caulking is otherwise indicated or obviously required on exterior of building(s).

Mix compounds which require field mixing as per manufacturer's instructions. Apply with gun especially for compound, to attain a smooth finish surface, free of wrinkles, air pockets and holes. Compress into joint with tooling rods or paddles to insure conformance of compound to even the smallest surface irregularity. Depth of joint shall be as recommended by Manufacturer of the sealant material. Pack joints required with sealant backer to bring voids to required depth before caulking.

SECTION 700

DISCHARGE PIPE AND GRAVITY DRAIN

701 GENERAL

This Section describes work, equipment and materials to be furnished by the Sewer Subcontractor.

All sewer systems are to be finished to a ready-to-operate condition. The Sewer Subcontractor is responsible for completing all sewer systems except for pump discharge and floor drain piping installed under the building foundation and slab.

The accompanying drawings have been drawn close to scale and have some listed dimensions. Care has been taken to maintain accuracy, but it remains the Contractor's responsibility to verify the scaled and listed dimensions.

The Sewer Subcontractor bid shall include a list describing the major types of equipment and materials to be used. After acceptance of the bid, changes to this list will not be allowed.

The Sewer Subcontractor will assume all responsibility for conforming to rules and regulations of the applicable government agencies and utilities.

The Sewer installation will comply with all specifications of the City of St. Louis Park. All piping that is not installed at a depth of 7.5 ft. shall have a covering of 2 inches of polyurethane insulation covered with a polyethylene jacket.

The invert elevation of the discharge and drain pipes are to be a minimum of 4 feet 6 inches below grade.

Excavations shall meet local and state safety regulations as applicable.

Backfilling is to be done to the specifications of the City of St. Louis Park.

Elevation and layout drawings will be provided to the City by the Sewer Subcontractor.

All construction permits will be obtained by the owner.

702 LAYING OF PIPE

All pipe shall be laid on undisturbed earth. If earth is disturbed or soft the loose earth should be cleared out and replaced with compacted gravel.

703 DRAINAGE AND SEWAGE CONTROL

The Subcontractor shall remove by well points, pumping, bailing, or other acceptable method any water which may accumulate or be found in the trenches or other excavations to be made. He shall take all necessary precautions to keep the trenches and other excavations entirely clear of water during construction of sewers and structures. Newly laid concrete shall be adequately protected from injury resulting from ground water or sewage or from the handling or disposal of water or sewage. No drainage ditches shall be placed within the area to be occupied by any structure except as permitted by the Contractor. Upon completion of new construction, existing sewers shall be restored or otherwise provided with adequate outlets. Permits will be obtained by the owner if necessary.

The Subcontractor shall at all times have upon the job sufficient pumping equipment ready for immediate use to carry out the intent of this section.

This Subcontractor shall at no time permit effluent contaminated by raw sewage to enter any storm sewer or open ditch.

Where existing sewers or drains are encountered in this work, adequate provisions shall be made for diverting the flow in the existing sewers so that the excavation will be kept dry during the progress of the construction work. Upon the completion of the construction work, the existing sewers shall be restored or otherwise provided with an adequate outlet as directed by the Owner.

704 BACK FILLING

As soon as practicable after the pipes or conduits are constructed and inspected, the trench shall be backfilled. At the sides and top from the subgrade to a level at least one foot above the top of the pipe, selected granular material shall be deposited and carefully compacted by hand or machine tamping or water flushing in layers not to exceed six inches in depth.

In undeveloped property the backfilling shall be completed using the available excavated material, free from boulders, rock, stones, lumber, masonry, debris, or organic material. Backfill shall be compacted to a minimum density equal to the adjacent area, as determined by the standard proctor density procedure, ASTM D-698. The remaining backfilling of the trench shall be carried up to limits directed by the owner with suitable allowance for shrinkage.

Backfilling in areas beneath streets or other paved areas shall be accomplished with pit run sand or gravel, thoroughly compacted in layers not to exceed 8" in depth for the full depth of the trench. Backfill shall be compacted to a minimum of 95% maximum density at optimum moisture content, as determined by the Modified Proctor Test, ASTM D-1557. Subcontractor shall maintain all such areas in a condition satisfactory to the city until permanent repairs are made.

If there is not sufficient excavated material suitable to meet the requirements for backfilling material, the Subcontractor shall make up the deficiency by transporting suitable surplus material from excavations on other parts of the Work to complete the backfill. If still deficient then material shall be hauled from offsite by the Subcontractor.

All material hauled on site for fill or backfill shall be loose dry earth, sand, gravel or bank-run gravel. A minimum of 6 inches of topsoil shall be used to cover all backfilled and filled areas.

Wherever gas mains, water mains, sewers, etc. cross the sewer trench, 3000 psi design strength concrete shall be used for backfill beneath them. This backfill shall extend from the bottom of the trench up to spring line of the pipe crossing the trench. A rough wooden form shall be used to hold the concrete in place. The thickness of the backfill shall be 6 inches greater than the diameter of the crossing pipe. Concrete so required shall be considered as incidental to the Work.

705 DISPOSAL OF UNSUITABLE MATERIAL

Excavated material shall be used in backfilling around sewers and other structures unless determined by the Owner to be unsuitable. Unsuitable material will be disposed of by the Owner.

706 ROADWAY REPAIR

This work shall include the replacement of all roadway surface damaged or removed due to the construction of the sewers and appurtenant structures. All such work shall be done in accordance with the specifications of the City of St. Louis Park. No permanent road surface repair shall be made until the backfill in the trench and around manholes has settled and the city has given their approval to make such repairs. The maintenance of temporary road surfaces during the period of settlement is specified hereinbefore under 704 BACKFILLING. All repairs shall be same type and at least equal to existing pavements. Edges of existing pavement parallel to trench shall be cut to a neat line prior to making a repair.

All the work necessary to make repairs to road surfaces will be included in the bid for sewer construction.

707 WATER TESTS OF DISCHARGE AND DRAIN PIPES

See Mechanical Work Section 202 System Testing

708 PIPING MATERIALS

See Mechanical Work Sections 207 Discharge Water Piping and 208 Drain Piping

APPENDIX C
CONTINGENCY PLAN

CONTINGENCY PLAN

This Contingency Plan outlines the course of action to be taken if contaminated drilling fluids, cuttings, debris or water are encountered during the activities described in the Site Management Plan. For the purpose of this Contingency Plan, contaminated materials are defined as follows:

Solids containing creosote or coal tar constituents will be classified as contaminated if the creosote or coal tar constituents exceed half of the solid mass.

Groundwater or drilling fluids will be classified as contaminated if the water exhibits a discernible oil phase or sheen.

In the event that contaminated soils are encountered during excavation for foundations or underground piping, they will be handled as described in the Site Management Plan. In the event that contaminated water is generated during excavation work, it will be handled as described in this Contingency Plan.

Handling of Contaminated Solids

For activities whose duration exceeds one workday, contaminated solid materials will be placed in an isolated location at the work site immediately upon exposure or generation. The location will be secured by eight-foot, chain-link fence with locked gates. Silt fencing will be placed inside the fence to control the migration of contaminated material from the area. The ground surface within the isolation area

will be covered with an appropriate impervious barrier capable of withstanding the deleterious chemical properties of creosote or coal tar materials. Appropriate storage vessels will be provided within the secured area and utilized for containerization of contaminated materials as appropriate to meet the intent of this Contingency Plan. Materials not considered applicable for containerization on the site will be stockpiled on the impervious barrier for subsequent loading onto transport vehicles. Stockpiled materials will be covered with an impervious barrier at all times, unless work is underway which affects (i.e., adding to or removing from) the stockpile.

For activities whose duration is one workday or less, contaminated materials will be removed from the work site before workday's end, if possible. If contaminated material cannot be removed by workday's end, the material will be placed in a secured area at the site as described above.

The handling of contaminated solid material, including its loading into appropriate storage vessels or placement in an isolated location on site, and its release to a transporter licensed to haul said wastes will be in accordance with the provisions of applicable regulations. Contaminated solid materials scheduled for off-site disposal will be transported to a RCRA hazardous waste TSD facility in accordance with the provisions of applicable regulations.

In the event the activity contemplated within the Site Management Plan is addressed in Section 11.5 of the RAP, contaminated soil that has been excavated will be replaced in approximately its original location and covered by clean soil to a depth of at least 12 inches.

In the event the activity contemplated within the Site Management Plan generates relatively small amounts of contaminated solid material, the contaminated material may be replaced in approximately its original

location, in which case it will be covered by clean soil to a depth of at least 12 inches. The determining factor in deciding whether contaminated materials may be returned to their original location will be the likely effects of such action on accomplishing the technical objectives of the RAP.

Handling of Contaminated Liquids

In the event that contaminated liquids are encountered or generated during the conduct of the work described in the Site Management Plan, the liquids will be pumped to the sanitary sewer if they contain less than ten percent organic material. Estimates of flow rate and disposal volume will be established and the Metropolitan Waste Control Commission (MWCC) will be informed before the discharge to the sewer if the estimated flow exceeds 150 gallons per minute per workday. Contaminated liquids containing more than ten percent organic material will be handled as solid material under the terms of this Contingency Plan.

Any drilling equipment with visible contamination will be steam cleaned upon completion of well construction or reconstruction work. The resulting rinsate will be handled in accordance with the provisions of this Contingency Plan.

Handling of Noncontaminated Materials

Solid material which is not contaminated -- as defined in this Contingency Plan -- yet appears to contain creosote or coal tar constituents will be retained at the work site. The material will be replaced in approximately its original location, or if not all affected material can be so placed, a second excavation will be completed at the work site for burying the material. In either case, the affected material will be covered with at least 12 inches of clean soil.

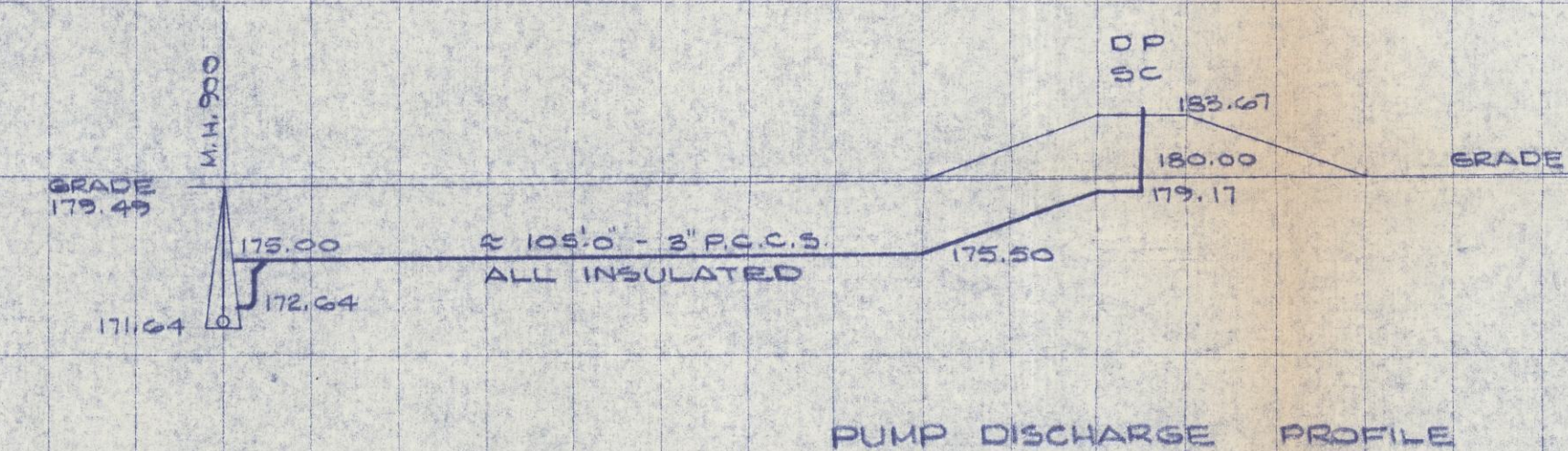
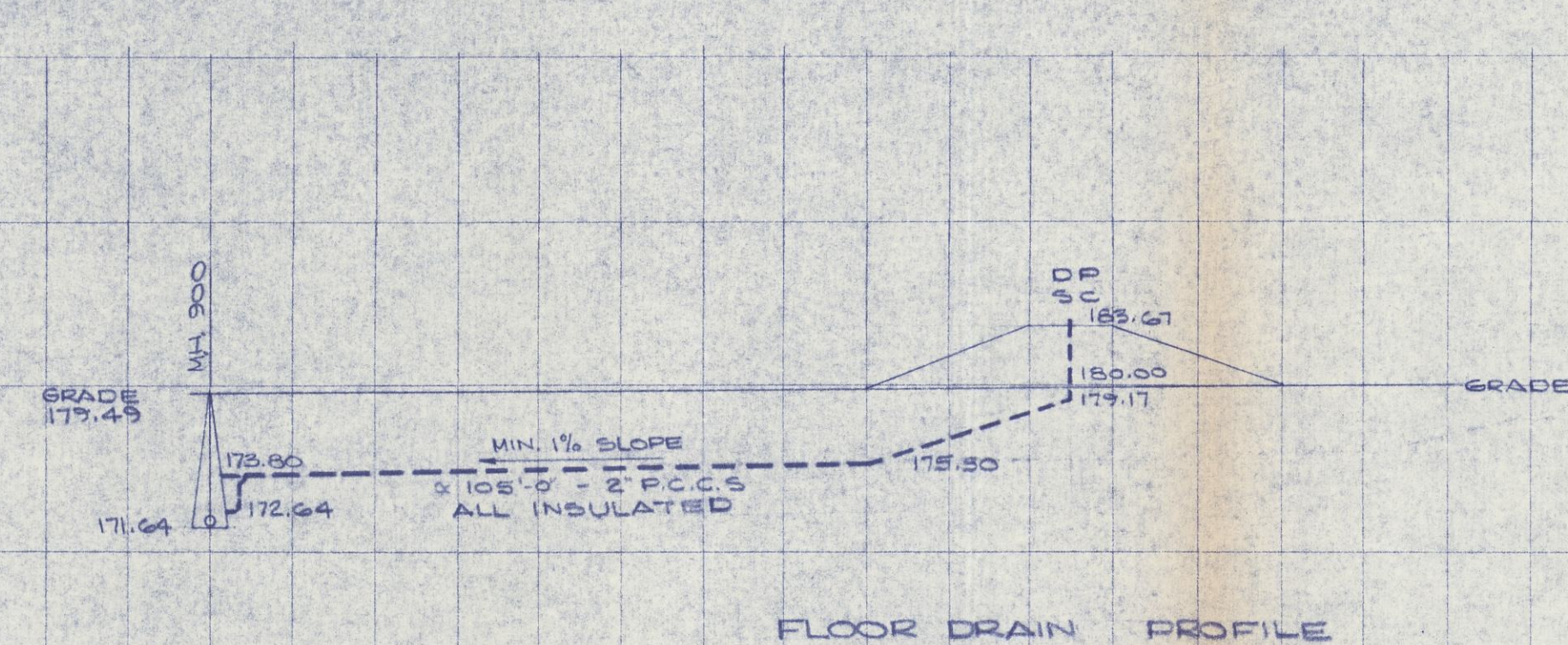
Unaffected excavated material taken from the second excavation will be removed from the site and affected material will be returned in its place.

Uncontaminated water (no discernible oil phase or sheen) resulting from the activities described in the Site Management Plan will be disposed of in the storm sewer or by any other means acceptable to the City of St. Louis Park.

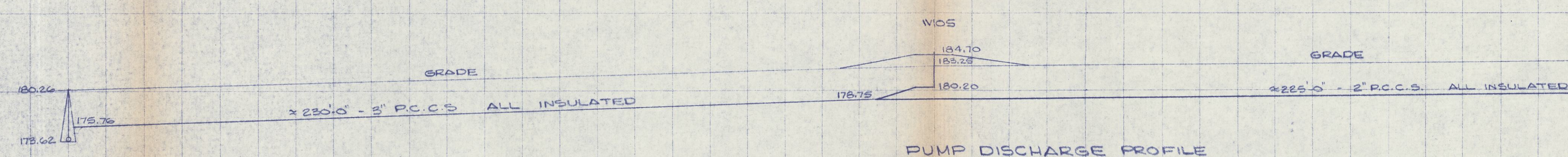
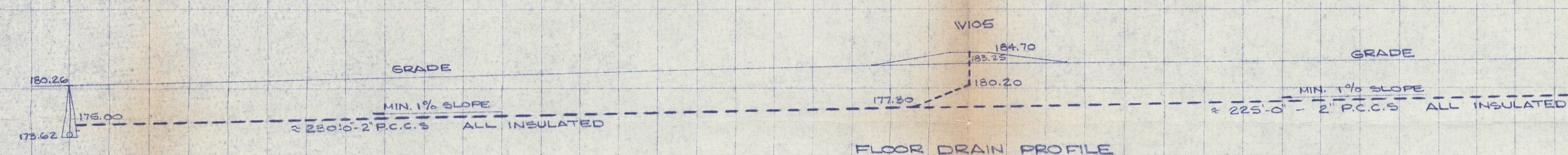
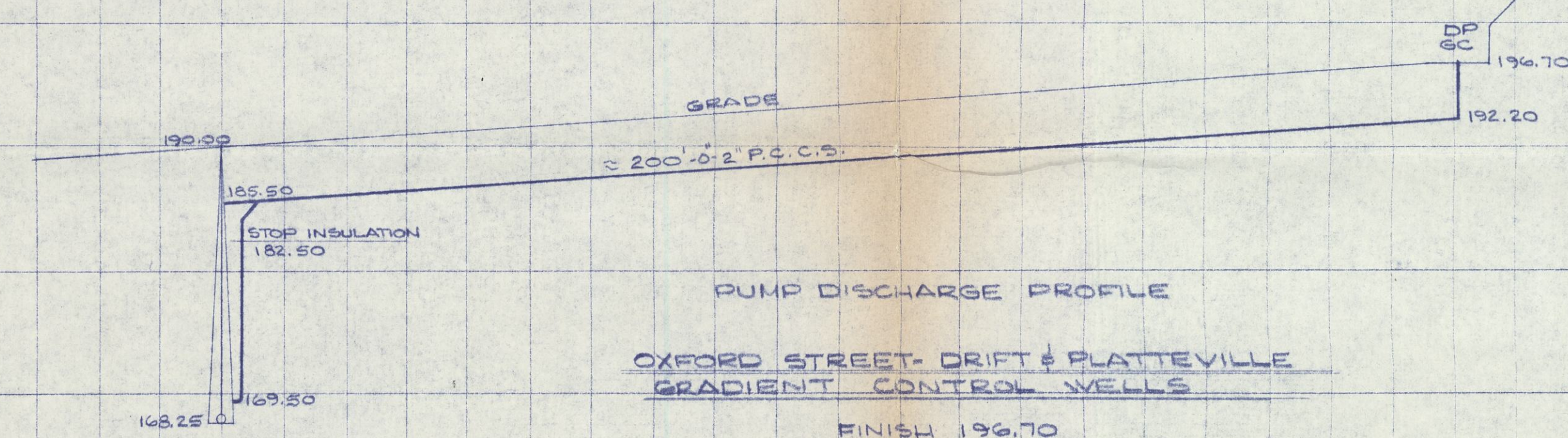
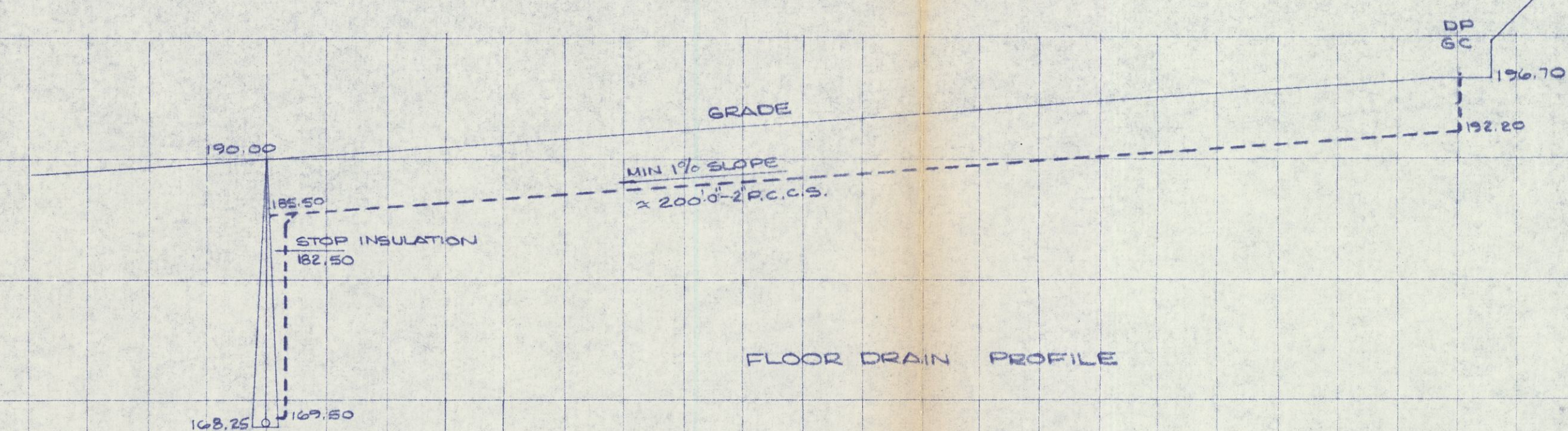
Communications

The Reilly Project Leader or Alternate Project Leader will inform the EPA, MPCA and City of St. Louis Park Project Leaders or Alternates of the status of actions taken pursuant to this Contingency Plan. Such notification may be oral or written, as agreed by the Project Leaders.

All actions, decisions and communications by the Reilly, City, EPA and MPCA Project Leaders in implementing this Contingency Plan will be in accordance with and are subject to the provisions of Parts I, J and O of the Consent Decree.

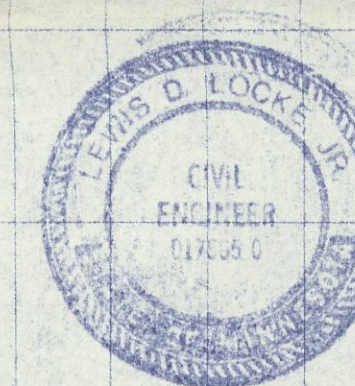


LAKE STREET - DRIET & PLATEVILLE
SOURCE CONTROL WELLS
EXIST. 180.05
FINISH 183.67



LOUISIANA AVE. W 105 & W 23
SOURCE CONTROL WELLS

W 105	W 23
EX. 183.25	EX. 184.00
FIN. 184.70	FIN. 185.20



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Lewis D. Locke, Jr.
Date 1/23/87 Reg. No. 017565 0

NOTE:
ALL PIPE ELEVATIONS ARE THE INVERT ELEVATION
--- REPRESENTS FLOOR DRAIN LINES
--- REPRESENTS PUMP DISCHARGE LINES

PHOTOSTAT	DATE:
MICRO FILM	DATE:

JAN 26 1987

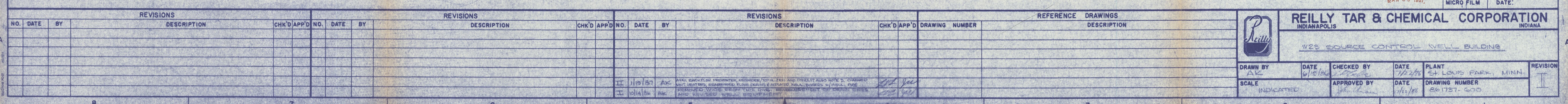
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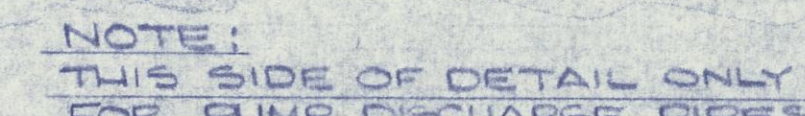
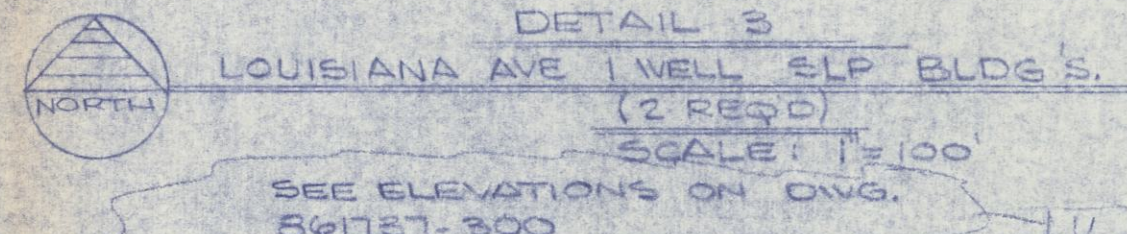
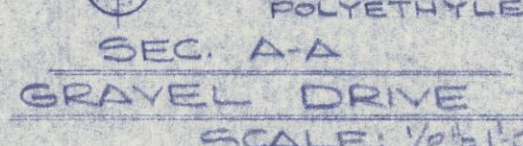
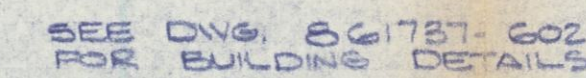
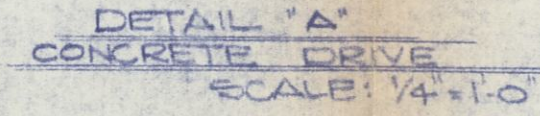


REILLY TAR & CHEMICAL CORPORATION
INDIANAPOLIS INDIANA

UNDERGROUND PIPING PROFILES

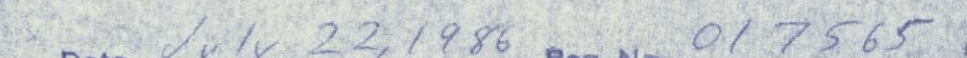
DRAWN BY AK	DATE 1/22/87	CHECKED BY <i>[Signature]</i>	DATE 1/23/87	PLANT ST LOUIS PARK, MINN.	REVISION
SCALE HORIZONTAL: 1" = 20' VERTICAL: 1" = 10'	APPROVED BY <i>[Signature]</i>	DATE 1/23/87	DRAWING NUMBER 861737-300		





NO SCALE
SEE DWG. 861737-300 FOR ELEVATIONS

3 EXTEND DRIVE TO STREET.



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MICRO FILM	DATE:

[illegible]